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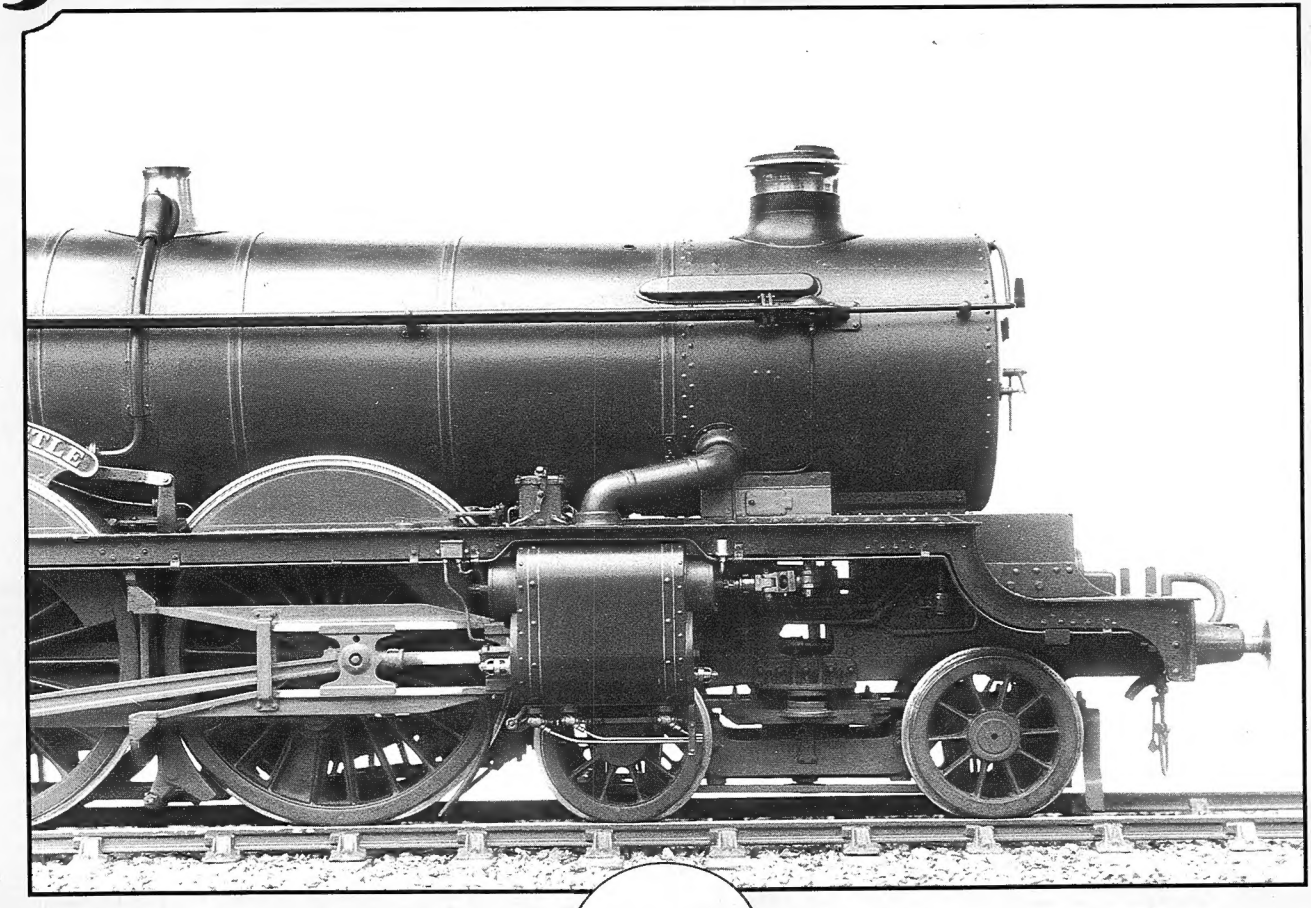

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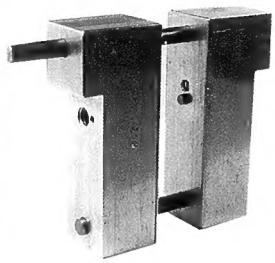

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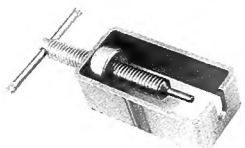

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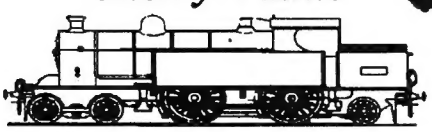

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No.2

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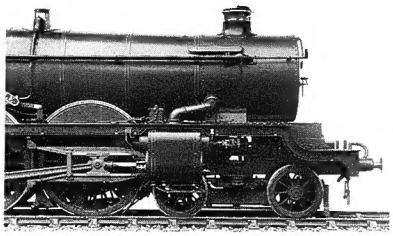

Cover photo: The front end of Tony Reynalds' 7mm model of No. 5026 Criccieth Castle.
TONY SMITH

Smart solutions

It is rare that this hobby stumbles upon a completely new product or process which has the potential to sweep away certain modelling conventions. One thinks of the introduction of plastics to the manufacture of R-T-R models which rapidly supplanted tinplate and diecasting, and the arrival of chemical engraving – or etching – to open the possibilities of kits for almost anything. It's not that we are short of innovation. On the contrary, our army of vibrant small suppliers are constantly coming up with new developments – but that's just what they are: developments. And even these – however new they may be claimed to be – can often be found to have some crude precedent way back in the mists of time.

It is therefore interesting to ponder whether this issue of MRJ really has come up with something genuinely new. We all know that leading-edge industries in the real world – astronautics, aeronautics and weapons for example – have developed esoteric materials, some of which have trickled down into everyday life, like Teflon and Kevlar. One such material now emerging is a 'smart' alloy known as SMA which can deform itself between memorized shapes under the influence of light electrical current. Our contributor Jacques Le Plat, a leading Belgian modeller, has been experimenting with SMA and finds that, in many cases, a single wire little thicker than a human hair can do the work of a much bulkier and more complicated solenoid or motor installation. His discussion on SMA includes a look at some of the applications he's tried and makes fascinating reading – not least for the possibilities which leap off the page. Acknowledging the innovatory spirit of the British finescale movement, Jacques is making shape memorizing wire arvailable to MRJ readers in the expectation that we can extend these exciting possibilities further still. Knowing our readership, that's entirely on the cards and we look forward to developments with bated breath.

Having said all that, we're equally pleased to publish a modelling solution which is as low-tech as you can get. The idea of pressing out half-etched holes to produce cosmetic rivet heads, as featured in so many etched kits, is apparently straightforward – but hands up anyone who has either burst right through the brass or ended up with a line of different sized heads. Well, that's everyone here for a start. Now look at John Hayes' gravity hammer on page 222 – a handful of readily-available, cheap steel parts that turn out perfect, even rivets every time. Point-lift-drop, point-lift-drop . . . just like that!

Bob Barlow

MODEL RAILWAY JOURNAL

Edited by Bob Barlow. Designed by Paul Karau.

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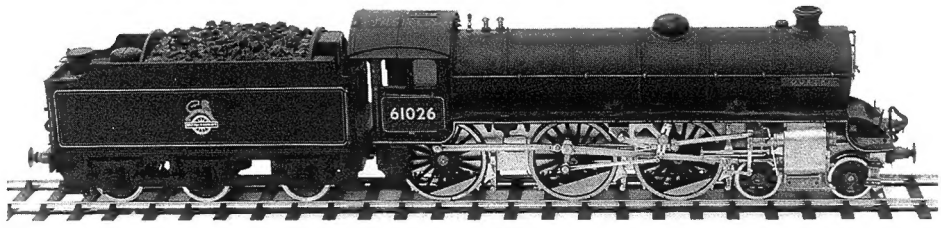
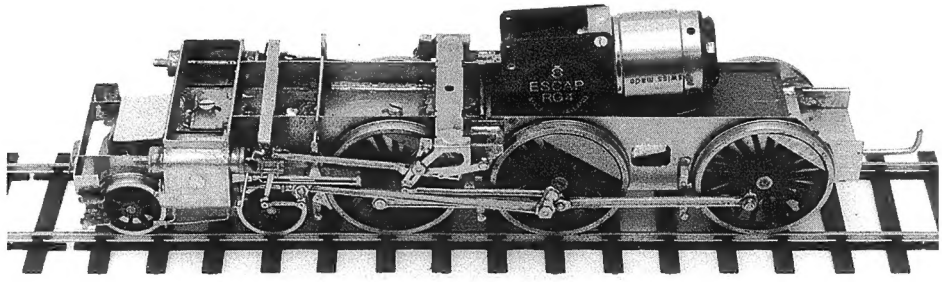
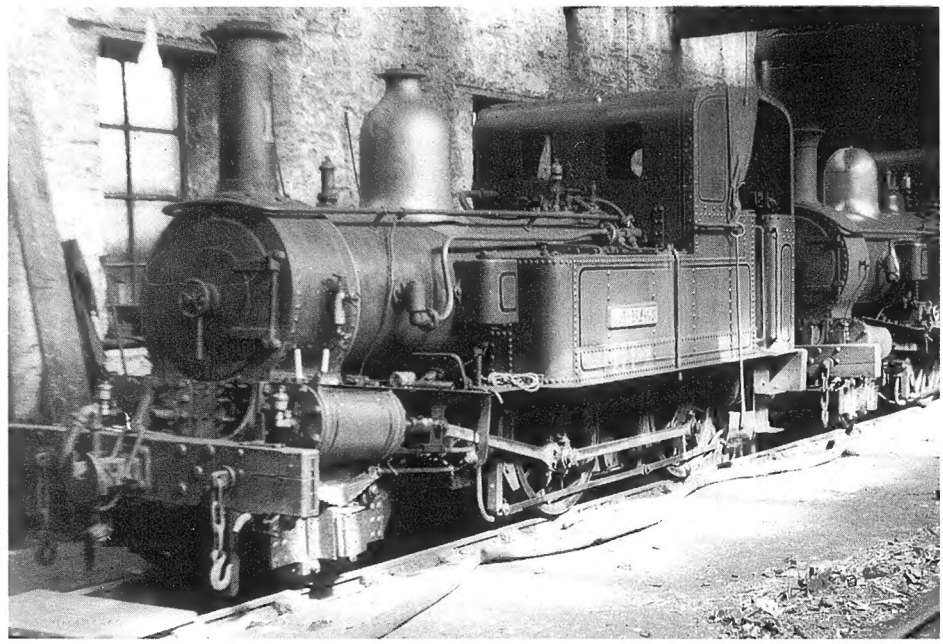
SMALL SUPPLIER FORUM





Dave Bradwell has introduced a 4mm chassis kit for the LNER B1 designed to mate with the Replica injection-moulded body which is generally available as a spare part (or, indeed, any other B1 body). It can be built in P4, OO or EM and, as you might expect from Dave, is a very thorough kit indeed, including a particularly fine set of valve gear and options for springing, compensation or rigid construction. You get a full tender chassis, chimney, dome and alternative smokebox doors, plus a very comprehensive set of instructions, but not wheels, gears and motor. Cost is £48 plus £1.50 post from Dave at 90 Churchway, Haddenham, Aylesbury, Buckinghamshire, HP17 8DR.



Rare view of Isle of Man Railway No. 1 Sutherland *– subject of the latest Branchlines kit – taken at Douglas shed in August 1959. Note the connecting rods attached to the front driver* inside *the coupling rods.* COLLECTION CYRIL GOLDING

TRADE GRAPEVINE

Three issues ago, as supplies of the last batch dwindled rapidly away, we published a 'last call' to those wishing to buy an MRJ KEY COMPONENTS PACK to enable them to join in our Manning Wardle scratchbuilding project. We got so many orders that we had to manufacture yet another batch! These are now down to the final 20-odd, after which there really will be no more made. They cost £9.95 each (including VAT) plus £1 post – total £10.95 payable to Wild Swan Publications Ltd., from MRJ, PO Box 800, West Wratting, Cambridge, CB1 5NB. You'll need to be quick!

DRAGON MODELS, a new and aptly-named concern based at 27 Llanwern Road, Newport, Gwent, NP9 9GF, has been set up by Chris Basten and Stephen Bell to produce aids for those modelling Welsh prototypes. The first batch comprises rub-down wagon lettering in 7mm, 4mm and 2mm scales, covering devices and lettering for the Cambrian, Taff Vale and Barry Company – six items in all, and for all three scales. These are good quality transfers and prices range from 80p to £1.60 per item. An SAE brings the Dragon list.

P. T. Moore, producer of the range of SKINLEY drawings of locos, rolling stock and associated subjects in 3mm, 4mm, 7mm and 10mm scales, is unfortunately having to increase prices for the first time in nearly four years. At prices from 80p to £5, they're still good value. The catalogue of subjects in 3, 4 and 7mm scales costs 75p from P. T. Moore at 56 Archers Court Road, Whitfield, Dover, Kent, CT16 3HS.

Having devoted the first half of 1994 to the introduction of five new 4mm locomotive chassis packs (LNER N2, GWR 'Castle', LMS 2P and two SR classes, 'Schools' and 'Lord Nelson'), COMET MODELS is spending the second half reinstating all those coaches which were deleted from its list some years ago; all will be available as sides or full kits. For the LMS, releases include two 12-wheeled sleeping cars – the Period II composite to D1781/1844 and the Period III first to D1926/2166 – plus two corridor firsts (D1930 and D2132) the open third D1999, the open composite D1903, two brake composites D1850 and D1932/2010, the 50ft full brake to D1854/2007 and the suburban third to D1906/2124, all Period III designs. The GWR gets four 'Sunshine' stock corridor coaches: A22 the all-first, C81 all third, D127 brake third and E162 composite. SR: D2318 Bulleid shallow-vented corridor composite plus the Tavern Car and its associated rebuilt trailer. BR: Mk I corridor brake first.

Flipping through some reading matter on other modelling disciplines, we came across a 4mm scale fibreglass hull and plans for a small and attractive modern bulk liquid-carrying ship, the *Miranda Guinness* (whose prototype's role in life is apparently to carry almost 2 million pints of Ireland's finest!). Made by MARTIN'S MODELS of Unit 7 Holland Park, Cyttir Road, Holyhead, Gwynedd, LL67 2PU (0407 765938), the hull and plans kit costs £47.50 plus £6.50 post and packing. This is a *small* ship – and it still comes out at 40in long in 4mm scale!

WYCHBURY LOCO WORKS has produced a second 7mm industrial engine kit – a Peckett 0–6–0ST in etched brass and nickel silver, complete with pre-formed saddle tank, motor mount and Ultrascale gears. Wheels and motor are required to complete. The kit costs £72 plus VAT, and a 4mm version is available at £38 (plus VAT), from 1a Market Way, Hagley, Nr. Stourbridge, West Midlands, DY9 9LT.

BRANCHLINES has produced a very nice 4mm chassis kit to go with the Airfix/Dapol plastic construction kit of the BR Standard Class 4 2–6–0, the latest in a series of successful finescaling link-ups with these old favourites.

Continued on page 218

LESSER WENLOCK

DAVID C. STONE describes an impressive first exercise in 4mm/EM:

Photos: MARK SMITH

It could be said that 'Lesser Wenlock' has been 30 years in the making! I've been playing trains since that fateful Christmas in the early '60s brought me my first Triang train set. Little did my parents know what they were starting. I still have the B12 that sparked off a five-year-old's imagination.

Over the years I have dabbled with 009, N gauge, and even a diversion into aeromodelling, but have found that railway modelling in 4mm scale gives me the most pleasure. A gradual dissatisfaction with the compromises dictated by using OO standards had been creeping upon me over a number of years, so I decided to go finescale. After a quick dabble in P4 waters, I concluded that EM was an ideal compromise between good scale appearance and relative ease in achieving smooth running without compensating everything in sight.

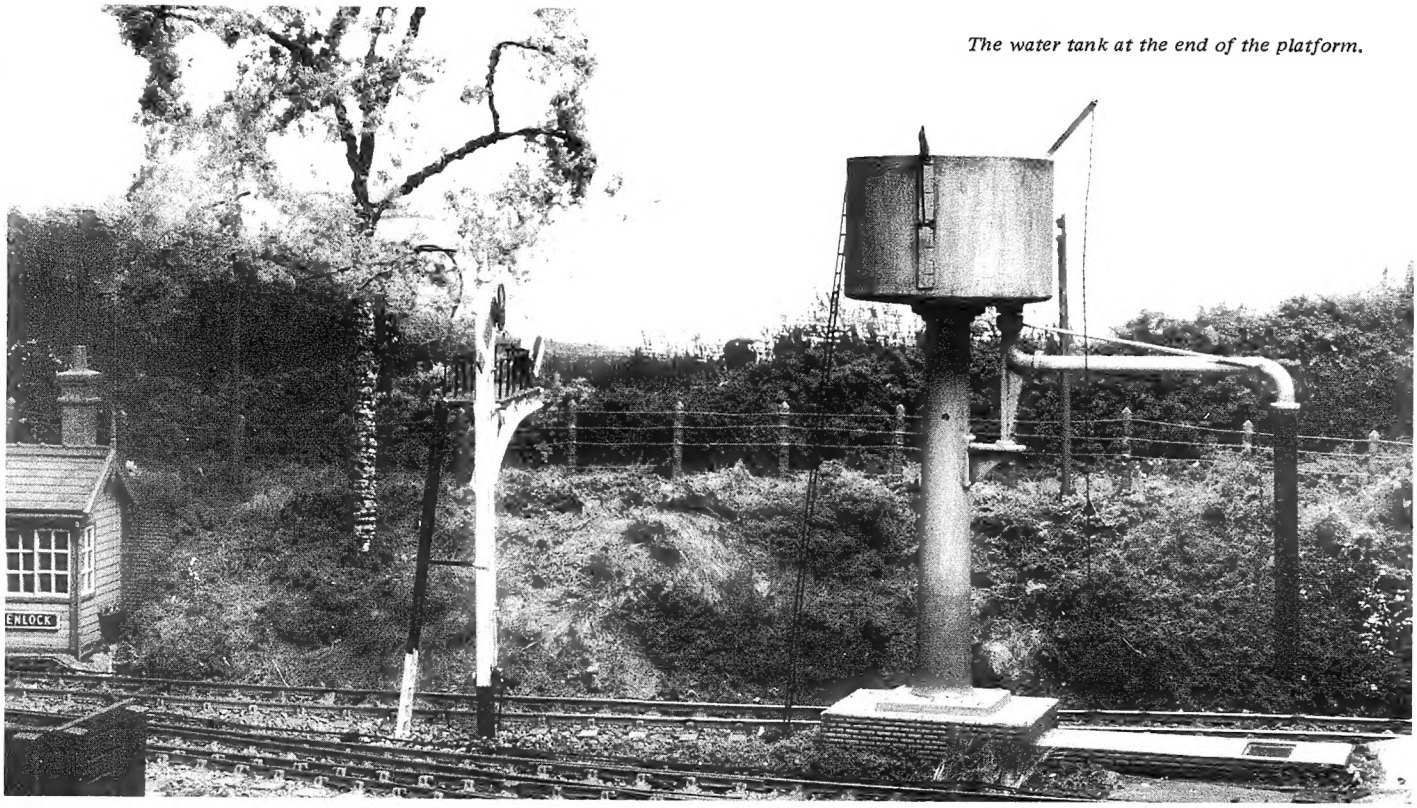
I also decided that modelling a prototype station would be somewhat restrictive, and that I preferred the freedom offered by a fictitious scene based on GWR practice. There were a number of scenic features that I wanted to model and it was unlikely that a prototype would include them all. As I have a penchant for small, early GWR locomotives, a branchline terminus set in the early 1920s seemed to give plenty of scope to indulge myself. Various track plans were drawn up to fit into my available site of 12ft x 2ft 3in before settling on this one. The plan was then drawn out full-size on old wallpaper, to check that it gave adequate stock clearance.

The baseboards were made using the spaced beam method described by Barry Norman in his excellent book *Landscape Modelling*. The tops were made from medium density fibreboard, laid only where the track was to eventually go – this allows the landscape to rise and fall naturally above and below this datum level. The resultant boards seem strong, warp-free and relatively light.

Pointwork was all made using EM Gauge Society jigs and gauges, along with wood sleepers and brass rivets as per the Brook Smith method. C & L cosmetic chairs were added, which I think make a vast difference to the finished track's appearance. The plain track is C & L flexi, which speeds up tracklaying and has caused no problems so far. To ensure that the track went in exactly the right position, I pinned the full-size track plan onto the boards and cut out the points from the paper. The resultant holes in the plan were used to position the finished points on the boards, which had previously been covered with cork floor tiles. Once all the pointwork was in position, it was a simple matter to fill in the gaps with the flexi-track.

The fiddle yard is a simple four-road sector plate arranged on a central pivot to act as a train turntable. This cuts stock

'Buffalo' 0–6–0ST No. 1192 on the headshunt with a couple of wagons from the yard while shunting the morning goods.



The water tank at the end of the platform.

handling considerably, but it could do with greater storage capacity, particularly during exhibitions when things get a bit cluttered. Track alignment is ensured by square-section bolts going into square-section tubing; these also provide the electrical feeds.

I wanted to be able to operate the layout from the front at home and from behind at exhibitions. With this in mind, a self-contained control panel – capable of being hung either in front or behind the layout – was designed and made. This panel contains a track diagram incorporating LEDs which give clear and accurate route indication. Flat-head nails were also fitted into the plan to act as terminals for the electric pencil used to change the points.

Peco point motors have been used, and have so far caused no problems whatsoever; the same cannot be said for their micro-switches which caused no end of problems switching frog polarity. These have all been changed for micro-switches available from Maplins which have a far more positive push-button action. Once this electrical gubbins had been completed and tested, I could finally start on the scenic side – the area I really enjoy.

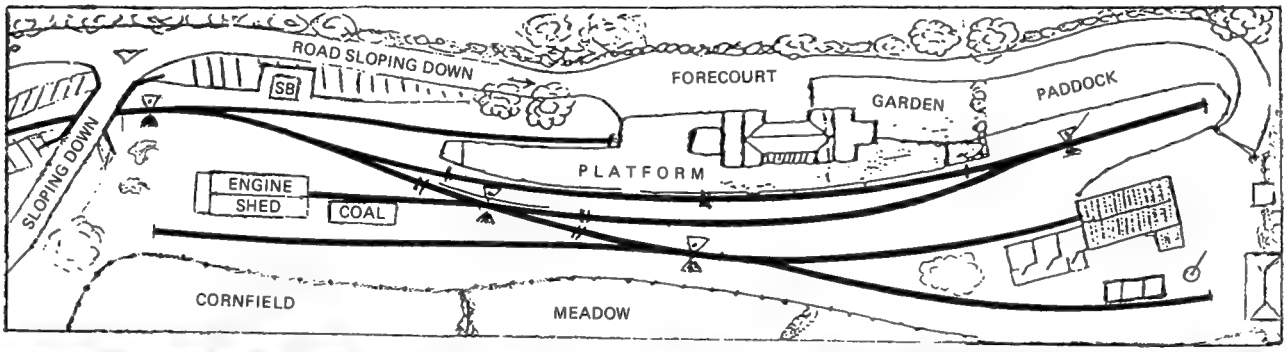
As mentioned earlier, I had no wish to model a prototype station but was trying to build a composite view of a

Lesser Wenlock signal box tucked neatly into the embankment.

typical branchline terminus. I cast through various books covering the Great Western, looking for likely buildings, and found one at Much Wenlock in Shropshire which was very appealing, with the added bonus that plans for the building were available in Chris Leigh's book *GWR Country Stations*. The plans were enlarged to 4mm/1ft and the building then constructed using layers of Slater's Plastikard. Once the basic box was completed, quoins and corbels were added individually. Details parts such as chimney pots, brackets and toilets were carved from wax, and moulds made in silicone rubber; self-curing acrylic resin was used to produce castings from these moulds.

Once the building was completed, work was started on the platform itself. I wanted this to be a separate module that would drop in and help disguise the baseboard joint. 12mm chipboard was used and cut out with a jig-saw. Then paving slabs were cut from plastic card and laid individually – tedious but very

Lesser Wenlock station basking in the morning sun.



'Metro' class 2–4–0T No. 615 running round its rake of four-wheel coaches, prior to making the return trip up the branch.

effective once grouted with Polyfilla. Humbrol enamels were used to paint both the building and the platform. The other buildings are also all scratchbuilt models of actual GWR buildings, with the exception of the goods shed which is based on an old Superquick design, though it has been entirely rebuilt using plastic card.

Groundwork was built up using plywood formers covered in wire mesh, then covered with plaster-impregnated bandage. Onto this surface I painted a thick coat of textured ceiling paint, which effectively seals the surface and provides a good base for scenic details. The white textured surface was then toned down with a wash of burnt umber water colour in preparation for the next stage.

In the past, I have always used ground foam scatters to represent grass, and have never been that satisfied with the result. Inspired by Barry Norman's book and articles in this hallowed tome, I set about using lint bandage and carpet underlay. The only problem I encountered with this technique was entirely my own fault. I had bleached the torn-up underlay and laid it in clumps to dry for a few days, but it was still damp on the day that I pushed it into a bed of PVA glue. All looked well until I tried to tear off the excess length, to give that straggly long grass effect, only to find that the whole wad of matting had set solid into a single piece! Capillary action had sucked the PVA up the damp fibres and locked them solid! After much cursing, I had to chisel the whole lot up. Next time I made sure the matting was bone dry, and everything worked beautifully (and I have subsequently learnt that old hands at this process resort to a tumble drier to speed things up). The fibres were then teased up and sprayed various shades of green and brown using an airbrush and watercolours.

I decided early on that I wanted to have a go at modelling a cornfield. All the books mentioned plumbers hemp, so I set off in search of the required material. I don't know if it's just in Wales, but plumbers hemp is about as elusive as the Holy Grail! I lost count of the number of DIY stores and hardware shops that I visited only to be told: 'No call for it, sir, everyone uses PTFE tape these days'. PTFE tape may be great for leaky joints, but it makes damn lousy cornfields! I finally tracked some down in a back-street hardware store in Splott, but where I'll ever get any more I just don't know.

Although I'm very pleased with the end result, planting bundles of hemp 15mm long into PVA glue brought new meaning to the word 'tedious'. I was certainly glad the field was relatively

small, and breathed a sigh of relief once the last bundle was planted. The trusty airbrush was then used to spray yellow ochre watercolour over the fibres, which, once dry, were detailed with a few red poppy heads.

Bushes and hedges were made using cast-off industrial floor polishing mats, sprinkled with Woodland Scenics foam and held in place with cheap hair spray. Theatrical hair has also been used, and, once back-combed into a ball and sprinkled with fine ground scatter, makes very effective brambles.

Trees were made using cheap florists wire; bundles of about 50 wires were bound together with fine wire to form the trunk and then splayed out to make the main branches and twigs. This framework was then painted with textured ceiling paint — two coats were generally needed to hide the wire framework and create a rough bark effect. Once painted, Woodland Scenics net was draped over the branches and held in place with PVA glue. The finished trees may not reach the standards achieved by Pendon's masterpieces, but the general effect is quite pleasing.

Once the scenery was completed, the track was ballasted using fine granite chippings, held in place with diluted PVA. When dry, the track and ballast were sprayed with Humbrol enamels to tone down the rather stark contrast between them.

Point rodding and signals were assembled using the excellent range of components from Derek Mundy's Model Signal Engineering, and, although fiddly, convincing results can be achieved. Syringe needles make excellent bearing tubes and the 0.8mm outside diameter (green colour code) has an internal bore that fits beautifully over 0.5mm brass wire. Provision has been made to allow all the signals to operate from below the base-

The goods shed and cattle pens.

Lesser Wenlock's stables and weighbridge at the end of the yard.

boards, but at present, although the rodding is in situ, it is just hanging there!

As mentioned earlier, I like small tank engines, and my chosen period of the early 1920s allows me a number of options such as open/closed cab, lined/unlined, plus an interesting range of coach liveries.

At present the only locos that I possess are a small Metro, built from a Falcon Brass kit, and an Alan Gibson 'Buffalo'. Both engines have sprung compensation and are powered by Portescaps; along with the use of a hand-held Pentroller, their smooth slow-running is a pleasure at last.

I am at present constructing a '517' which I think I will finish fully-lined out, and resplendent with a brass dome. An Armstrong or Dean Goods would also make a nice addition, but when I get around to building one is anyone's guess.

The wagons are the usual mix of Coopercraft and Slater's with the odd etched brass or whitemetal kit for the more unusual prototypes. None are compensated and they all seem to run without any problems; I think that weighting each wagon to give an axle loading of 25g has helped track holding. The only exception is a six-wheeled siphon from D & S Models which comes with compensation as part of the kit. Six-wheelers are notorious beasts, but as this one behaves beautifully, I guess the compensation must work.

The coaching stock at present consists of a rake of Ratio four-wheelers, which with a bit of judicious detailing can pass as a very acceptable rake, and a solitary Slater's clerestory. The Slater's kit is a real pleasure to build and I think will be joined by a couple more in the very near future.

Couplings are one thing that I am still not sure about; I like the look of three-links, but the large hand descending from the sky does, I feel, shatter any illusion of reality. Jacksons look nice and very unobtrusive, but I have my doubts about consistent coupling and uncoupling without resorting to checking stock with a jig every 10 minutes or so! I have plumped for 3mm scale Spratt & Winkle types which seem to work well, and once painted black don't look too bad, to my eye anyway.

That just about sums up 'Lesser Wenlock'. It has taken around three years from start to finish, and I still get a lot of pleasure looking at it. The layout was first shown to the public at this year's Cardiff Model Railway Show. It performed well all weekend apart from a mysterious electrical fault which cured itself after about five minutes and has never happened again! I would like to thank the members of Whitchurch & District Model Engineering Society for their advice and encouragement, and especially to Frank Dyer who got me out of trouble more than once during the construction of my first loco. Finally, thanks to Mark Smith for the excellent photographs which certainly do more than justice to my modelling efforts.

SHAPE 'MEMORIZING' WIRE

A Breakthrough in Actuation

Noted Belgian finescale modeller JACQUES LE PLAT has discovered a high-tech alloy which, in certain applications, can replace solenoids, motors or switching gear with a single thin wire:

Our hobby has not been short of innovation in recent years, but in terms of movement, both for control and animation, we are still confined to the good old methods – using actuators driven either by solenoids or small electric motors. These have proved efficient in most cases, but they do have disagreeable drawbacks. Solenoids, for example, are often jerky, whilst motor drive is rarely directly linear and thus requires complex linkages, not to mention the associated problems of size, noise and cost.

Well, today there is another method of actuation available in the form of Shape Memory Alloy (SMA) which provides motion through heat. You can take an SMA wire as thin as a human hair, apply a little voltage to warm it up, and it will contract, using the motion to actuate a movable model device of some kind with a surprising amount of strength. As soon as the voltage is switched off, the wire will relax and allow the model device to move back to its original position.

I know that several firms serving the hobby have secretly developed new items utilising SMA components but, alas, appear unwilling to release them; I can only assume this is because they compete with existing products which are still profitable. As a passionate modeller myself, I don't hold with this 'freezing' strategy. I have been experimenting with SMA since 1989 and have come up with some promising applications which may be of interest to MRJ readers, especially those innovators who would like to try their hand at some revolutionary actuation. Let's examine a little theory first, then I'll explain how SMA can be used to animate the model railway.

FUNDAMENTALS OF SMA

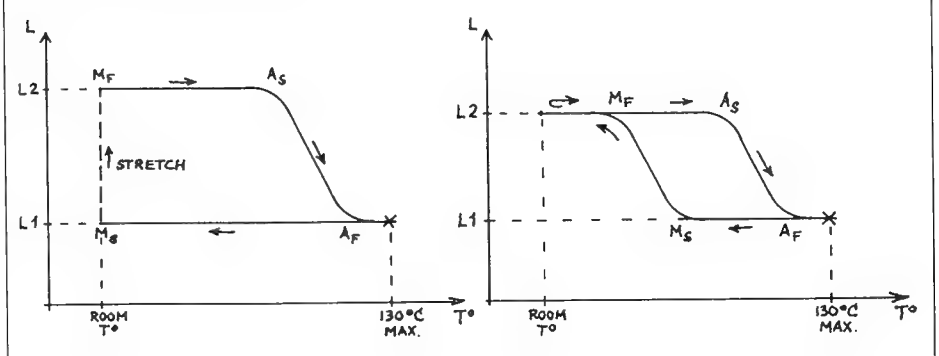
Shape memorizing alloys have the ability to change their crystal structure according to temperature. At room temperature their crystal mesh is what is known as 'martensitic', whilst at a pre-defined higher temperature it will change to an 'austenitic' mesh. These structural names need not concern us too much; suffice it to say that if a piece of SMA remains in the shape or configuration in which it was manufactured, no dimensional changes will occur when it passes from martensitic to austenitic. However, if the SMA is previously put out of shape by bending, compressing or stretching, this 'martensitic deformation' will be cancelled by the change to austenitic. In other words, the alloy returns to its original shape. The SMA behaves as though it has recorded its original manufactured shape in its crystal memory, and keeps remembering it through subsequent distortions. That, of course, is why it is called 'Shape Memory Alloy'. As well as this one-way memory effect – where the material only returns to one basic shape – a two-way effect can be created by using SMA which has been deformed at the manufacturing stage, and therefore made to 'remember' its particular shape. Now the sample not only goes to its introduced shape when heated with current, but returns to its originally deformed shape when the temperature drops. In other words, the material oscillates between two specific shapes according to temperature. It behaves as if it has a dual shape memory, a process logically known as 'reversing'.

SMA can be formulated from different metals, each performing differently. For modelling applications nickel-titanium (NiTi) alloys are best in terms of mechanical strength, electrical resistance and life. Related to weight they are not exactly cheap, but, as you'll see, modelling applications require only tiny quantities. To my knowledge, there are three bulk manufacturers of such alloys in the world: Furukawa (Japan), Raychem (USA) and Swissmetal (Switzerland) but tens of smaller companies and research groups devote themselves to further SMA treatments and applications. Today, most applications are still confined to advanced technologies where weight and volume are critical – astronautics, aeronautics, robotics, medical prostheses and also for certain automatic safety devices. Like most alloys, SMA can be processed into forms: bar, rod, tube, springs, even coating films and, most interesting for us, thin wire nearly as strong as piano wire. These offer unique possibilities to the modeller.

'ONE-WAY' AND 'REVERSING' WIRES

Let us firstly see how shape memory effects apply to flexible wires. The two following graphs allow you to better understand how Shape Memory Wire reacts to temperature. The first one is for One-Way Memory Wires, i.e. untreated wires. Starting at point M_s (M for Martensitic), the wire is supplied under its shortest shape L_1 representing its basic memorized length. The wire has first to be deformed by stretching it to a longer length L_2. This is showed by path M_s–M_f. Then, as the temperature goes up, the wire starts to contract from a specific temperature A_s (A for Austenitic) and the basic length L_1 is totally recovered at temperature A_f. As the temperature goes down, no further change occurs, length L_1 remains unchanged and we come back to point M_s. The second graph is for Reversing Memory Wires. This time the wire is deformed (stretched) and treated by the manufacturer so as to memorize its stretched length L_2 as well as its basic length L_1. We are starting at point M_f, as the wire is now supplied under its longer shape L_2. When heated, the wire starts to contract at temperature A_s and returns to its basic length L_1 at temperature A_f. As temperature decreases, the wire follows a reverse path shifted about 30°C (55°F) towards lower temperatures (hysteresis cycle). Starting from a particular temper-

DRAWING 1: *'One-way' (left) versus 'Reversing' (right) Memory Wire: reaction to temperature.*



ature M_s, the wire automatically expands until its length L_2 is reached at final M_f point. The wire is now ready for serving again without any mechanical stretching.

MEMORY WIRES IN MODELS

SMA may be heated by any means – a warm bath, heating jacket, radiation, etc. But with thin wires, forming a significant electrical resistance, the easiest way is to apply an appropriate voltage, AC or DC, to the wire ends, thus generating a heating current by Joule's effect. For most modelling projects I recommend a wire of 120 microns (.055in diameter) whose approximate retail price may vary from £5 to £12 per metre according to quantity. Such a wire has a specific resistance of 75 Ohm/metre and requires a heating current of about 230 mA to fully contract. Lengths for typical applications lay in the area of 50 to 100 mm, thus forming a resistance of 3.8 to 7.5 Ohm and requiring an electric power of $R \times 1^2$, equalling .2 to .4 W, a value easily obtainable from any model railway power pack.

By attaching one wire end to a fixed point and connecting the other end to a movable model device (gate, arm, switch, etc.) we have built the simplest funicular command one can imagine. With the appropriate voltage applied, the wire contracts and moves our device one way. Compared to motors, the displacement is directly linear and self-stopping; compared to solenoids, the motion is progressive (smooth) and silent. As soon as the voltage is switched off, the wire cools and relaxes. Because flexible wires have no pushing strength, nothing will happen unless our device is pulled the other way by a reacting force. This can be a spring or simply a counterweight. And here we are back to the difference between One-Way Memory and Reversing Memory. By using a One-Way Memory Wire we will have to stretch the wire again before the whole process can be recycled and this means that the counter-force will have to be strong enough not only to move our model device back in place but also to lengthen the wire. An appropriate calculation and mechanism design will then be necessary. By contrast, a Reversing Memory Wire will stretch out on its own and the counter-force may remain low, just enough to move our device back in place. It not only makes our life easier, it also allows safer and more consistent operation, cycle after cycle. This is why I am working exclusively with Reversing Memory Wires, despite their slightly higher price compared to One-Way Memory Wires.

LIMITATIONS

Ni-Ti wires should not be submitted to working stresses in excess of 150 MPa if we want them to perform a high number of cycles (100,000 and more). With our 120 micron wire (.055in diameter) this means a maximum pulling force of 1.5 N (.34lb or 150g). Theoretically, it will easily produce twice as much force but not for a very high number of cycles. So if we need 2 N it is better to use two wires in parallel. However, in modelling projects we should be able to do a lot within the 1.5 N limit. Another consequence of the maximum admissible stress is that nothing should block the wire in its natural contraction. Some flexible section or spring should always be provided in the linkage mechanism in order to compensate for any unexpected blocking. For the same reason, any sharp bend of the wire should be avoided.

The available working displacement is directly related to the initial deformation of the wire which can go as high as 8% of its basic length; however, such a figure will considerably shorten its lifetime. Normally, wire stretching should not exceed 4%. Like most continental model railway firms engaged in this technology, I am using Reversing Memory Wire manufactured by AMT, a Belgian company affiliated to Swissmetal. Their standard wires are treated with a 3.5% stretching factor, which means that they retract 3.5% of their supplied length.

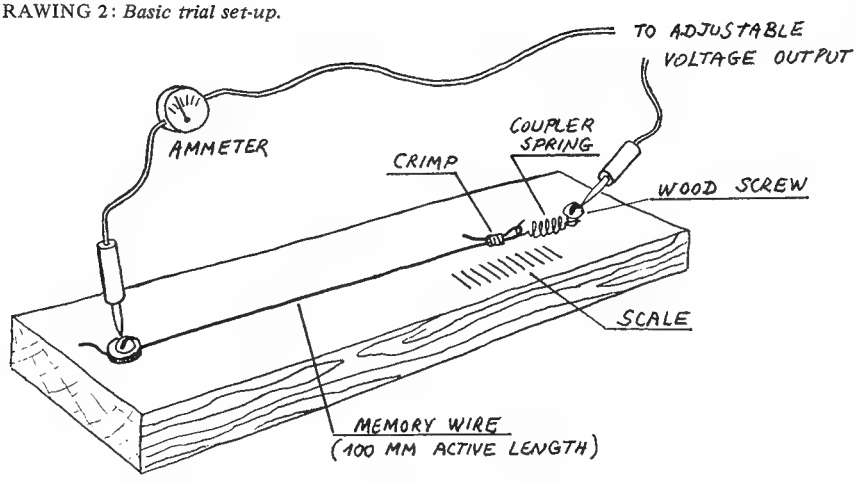
SMA are not only sensitive to overstraining but also to overheating. So Ni-Ti wires should not be exposed to temperatures higher than 130°C (265°F). It is not easy to measure such a temperature in the wire, but it is enough to know that this temperature lays a few tens of degrees above the temperature required to fully contract the wire. Practically, a good way to stay on the safe side is to control the voltage applied to the wire. This should be done at the beginning of any project by progressively raising the voltage being applied until full contraction is observed. The corresponding value should then be noted and considered as the admissible maximum. Another advisable step is to mechanically design an application so that the wire remains hot for the shortest period. For instance, in a stop signal application, the design should allow the wire to stay cold in the 'danger' position and to be heated only to open the signal, not the contrary. One last recommendation: soldering the wire is obviously not recommended and one should attach its ends exclusively in mechanical ways (screws, crimps, clamps).

As far as timing is concerned, it is not easy to give reference values because warming and cooling processes largely depend on the electrical supply data as well as on the surrounding conditions. I may at least say that the transformations are always progressive, so that jerky motions can't be expected. For example, working at room temperature (with no air draught!) and considering a minimum voltage being abruptly applied, a 120 micron wire will take 2 to 3 seconds to fully contract and about the same time to relax. A good way to prevent time deviations due to surrounding interference is to place the wire inside some type of insulating sleeve (Teflon catheters are perfect for the purpose!). Another way to control motion timing is to electronically control the electric current going into the wire. By slowing down the rising and the falling current one can increase the time needed for the wire to contract and to relax. At the end of this article I'll propose a simple example.

GETTING STARTED

A good way to familiarize yourself with SMA wires is to take a 130mm length of Reversing Memory Wire, lay it on a wooden board, squeeze one end under a wood screw, shape a short loop at the other end by means of a crimp, link it to

DRAWING 2: *Basic trial set-up.*



an OO/HO coupler spring and attach the spring's other end to another wood screw, taking care to eliminate any slack.

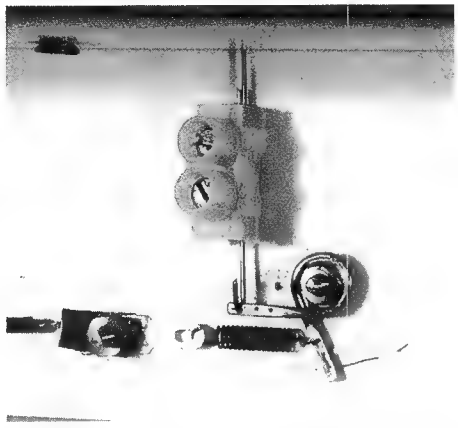
Now connect the two wood screws to the regulated DC output of your power pack and slowly raise the voltage from zero until you see the wire starting to contract. Go on carefully until you see no more wire reaction by increased voltage and mark this step on your power pack. This is the maximum permissible value which you should not exceed for this particular mounting. Then by switching the supply repetitively off and on, you'll soon get a good feeling of the wire reactions. It may be helpful to lay down (or draw) some sort of scale rule parallel to the wire in order to better appraise the back and forth movements. You'll observe that the total displacement is about 3.5mm (3.5% of an approximate 100mm active length). Another suggestion would be to insert an ammeter in the wiring circuit so that you can follow the current variations. You should normally observe that full contraction is obtained in the vicinity of 200mA and that the current then increases a little further for an unchanged voltage. This is because the SMA material loses 25% of its electric resistance when passing from martensitic to austenitic structure. Sophisticated electronic supplies could take this into consideration by first producing a voltage peak in order to heat the wire above martensitic limit and then slightly reducing the voltage to just hold the heating current at its necessary minimum. But such a refinement is beyond our normal needs.

TYPICAL APPLICATIONS

Animating a signal or level crossing are among the most obvious applications for Memory Wire actuators. For realism's sake, motion has to remain smooth. Jerky solenoid actuators impose a toylike operation; DC motors are better but require a rather complex mechanism to convert their circular drive into linear motion and to stop and reverse polarity. As you can see, Memory Wires offer a much simpler solution. No surprise, then, that the first commercial model railway accessories offered with Memory Wire actuators were signals and crossing gates, manufactured by Brawa (Germany) and marketed under the 'Slow Memory' label. They were first discovered at the 1990 Nürnberg Fair and have actually been on sale since 1992. Myself, I developed a micro-actuator for the French firm MKD to fit their HO-scaled SNCF modern grade crossing. It was unveiled at the 1990 Paris Fair, just one week before Brawa at Nürnberg . . . but, by lack of enterprising spirit on the French side, it had no commercial life. Since then, I have designed a larger, more universal version, easy to scratchbuild and suitable for a number of situations. Here is how it looks (*above, right & below*).

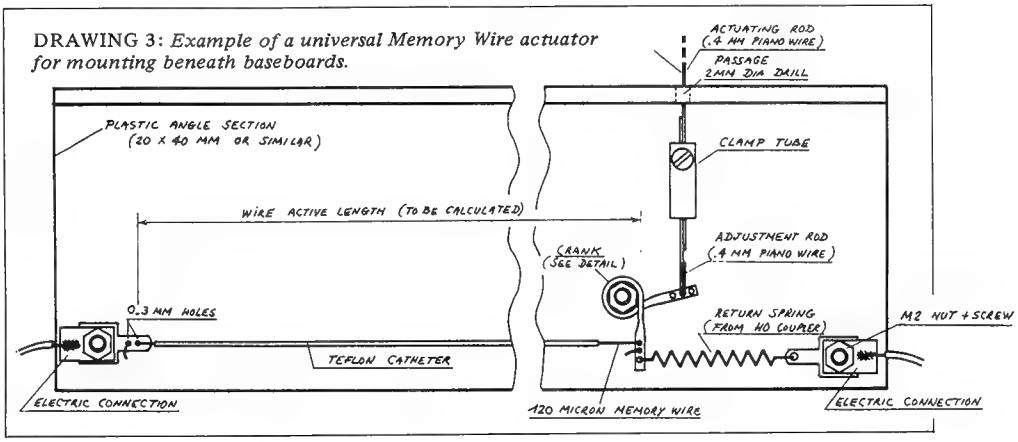
This old-fashioned SCNF grade crossing is intended for my steam era layout and is made from a brass and bronze kit by LMJ (PO Box 25, F-89301 Joigny). Each gate is worked by its own Memory Wire actuator and both actuators are wired in series. The gate weight (all bronze) is such that I had to select a reinforced return spring and a longer Memory Wire than usual (113mm active length).

Although it suits other applications, it is primarily intended for operating grade crossings. For more versatility, each gate is provided with its own actuator. This increases the total cost, but there is no extra linkage between the gates that would require delicate adjustments under the layout. Furthermore, it may create small operating differences between the two gates similar to the prototype. Each actuator is attached with two screws to the underside of the layout table directly below each gate post. The gate itself is moved by a vertical rod (.4mm dia piano wire) which will have to be shaped specifically to fit each type of gate. I leave it up to you to adapt the upper part to your



Close-up view of the crossing's mechanical parts. Note the clamp tube (from an electric connection strip) linking the actuating rod to a short separate section attached to the crank. By adjusting the overlap, one can precisely set the correct start position of the gate in relation to the Memory Wire in cold condition.

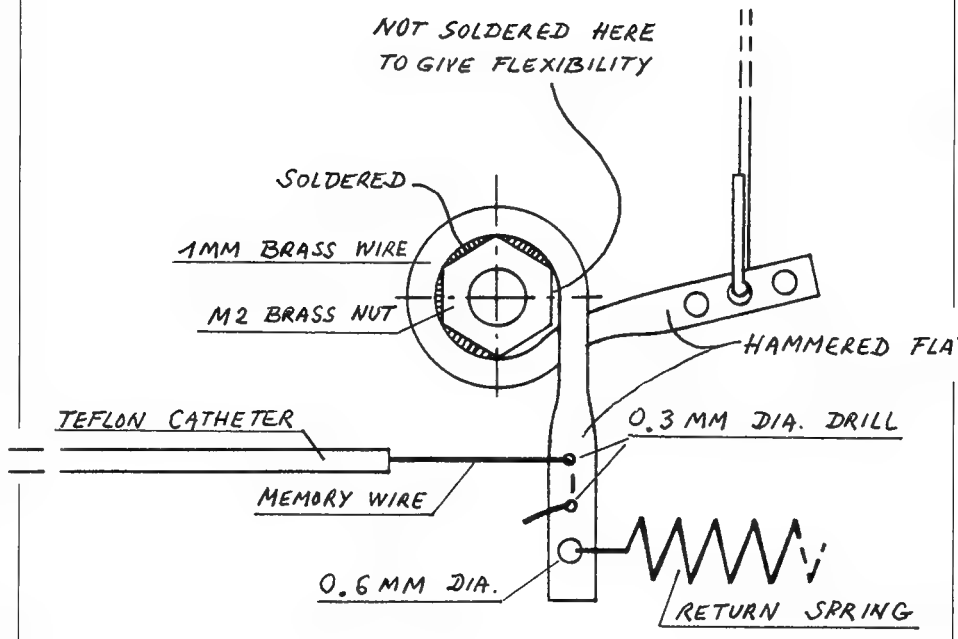
DRAWING 3: *Example of a universal Memory Wire actuator for mounting beneath baseboards.*

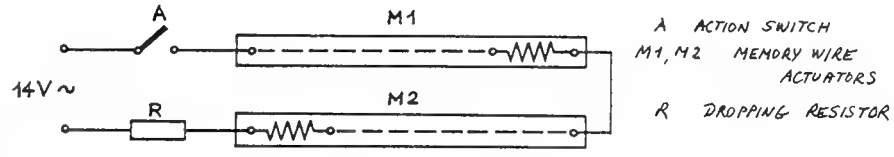

ACTUATING ROD (.4 MM PIANO WIRE)
PASSAGE 2MM DIA DRILL
PLASTIC ANGLE SECTION (20 X 40 MM OR SIMILAR)
CLAMP TUBE
WIRE ACTIVE LENGTH (TO BE CALCULATED)
ADJUSTMENT ROD (.4 MM PIANO WIRE)
CRANK (SEE DETAIL)
0.3 MM HOLES
RETURN SPRING (FROM HO COUPLER)
M2 NUT + SCREW
TEFLON CATHETER
ELECTRIC CONNECTION
120 MICRON MEMORY WIRE
ELECTRIC CONNECTION

own. The important thing to remember is to link the rod as close as possible to the gate pivot point, thereby reducing the linear motion and ultimately the necessary length of Memory Wire. The rod should be cut long enough to go through the roadbed and table and to overpass its connection point with the actuator. After this connection is made (by a clamp tube allowing exact adjustment of the gate's initial position), the excess length can be cut. The wire mechanism is mounted horizontally on a plastic angle section. A simpler set-up is possible by positioning the wire vertically in direct alignment with the actuating rod, but it would dangerously protrude beneath the table. Thus, since I give preference to a horizontal mounting, the vertical rod travel has to be turned 90 degrees by a crank. This crank, representing the most complex part of the system, is simply made from a 1mm (.040in diameter) brass wire shaped and soldered to a M2 (metric 2mm) hex nut. It freely rotates on a fixed M2 screw. Both ends of the brass wire are hammered flat and then drilled to accept connection with the Memory Wire and the return spring at one end and with the actuating rod at the other end.

To attach the Memory Wire, I am personally fond of lacing the wire ends through two contiguous holes bored by a very small drill (.3mm dia.). By this method, wire length adjustments remain possible at any time. I have also foreseen three possible holes to connect the actuating rod so as to allow adjustment of its travel in relation to the Memory Wire motion. They offer different travel ratios, starting from 1 to 1. The length of the Memory Wire has to be calculated case by case according to the rod travel required and the most probable ratio to be used. For instance, if you need a 3mm rod travel and if the movable model device is not too heavy and has a light return spring, a travel ratio of 2 to 3 can probably be accepted and a 2mm wire contraction will be enough. However, a small reserve has to be added to compensate for unavoidable linkage clearances and it is wise to take 2.5mm into account. Remembering AMT's 3.5% contraction factor, this finally gives an initial active length of 72mm for the Memory Wire (under relaxed conditions). In case of heavier movable parts, a travel ratio of 1 to 1 should be preferred, thus requiring a full 3mm wire contraction, brought up to 3.5mm for clearance compensation, and giving, finally, a wire length of 100mm. I doubt that a wire shorter than 50mm can be used because the short displacement is likely to be offset by the mechanism clearances. On the other hand, using very long wires, in order to get considerable contraction motions and the possible higher actuating forces by leverage transfer, is certainly acceptable, but the price of the Memory Wire and actuator requirements will limit such attempts and lead you back to more classical solutions. For further mechanical details please refer to the drawings and the photos.

DRAWING 3A: *Crank detail.*





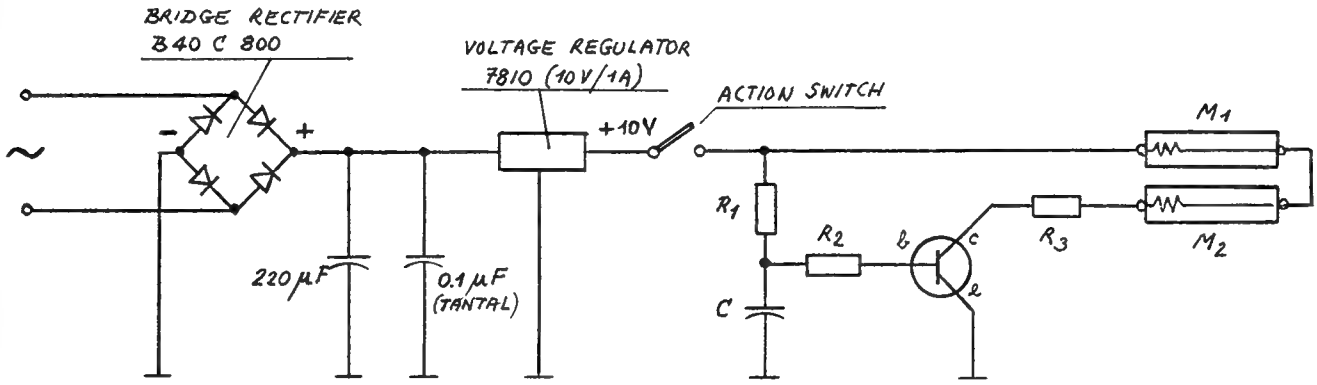
DRAWING 4: *Elementary power supply for dual actuators.*

FEEDING THE ACTUATORS

As you already know, all you need to operate the Memory Wire is to connect it both ends to an appropriate and permanent voltage. Due to its small electric resistance, typical voltages required are low, as low as 1.5 to 2V and an AA alkaline battery could do the job for a while (useful for display purposes at an exhibition perhaps). However, connecting it to the AC auxiliary output of a power pack is a more economical solution in the long term. As such output is normally too high (14V and more), the supply has first to be lowered with a resistor connected in series. And for a dual application like our level crossing, we have also to wire both actuators in series. But as you can observe on Drawing 3, each actuator is supplied through its return spring. For an electrician, this is not a smart design because the passage of the current is subject to tension in the attachment and the spring is submitted to heat; however, it adds to the total circuit resistance and allows a simpler mounting – I can accept the incongruity. In five years, I can't report any failure of the design and I'll certainly persevere.

Knowing that the current should be held around 220-230 mA, the value for the dropping resistor can easily be calcu-

DRAWING 5: *Control circuit allowing control of Memory Wire motion speed.*



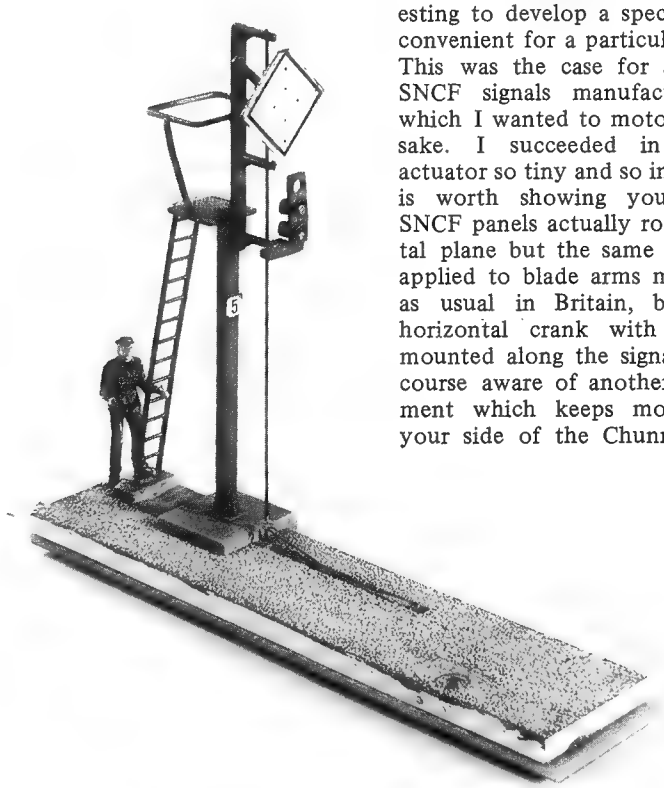
lated by elementary Ohm's law after some preliminary measurements. An important point to remember is that the power to be dissipated is far from being negligible and therefore a 2W or even a 4W size resistor should be provided.

As said before, this elementary wiring will generate 'natural' motion speeds in the area of 2 seconds. If we want to depart from those, we'll need an electronic circuit allowing control of the rising and the falling current in the wire. Electronics not being my preferred subject, I'll content myself with the following uncomplicated circuit. Others I'm sure will be able to come out with more sophisticated solutions, possibly interlocking further effects (flashing lights, bells, etc.).

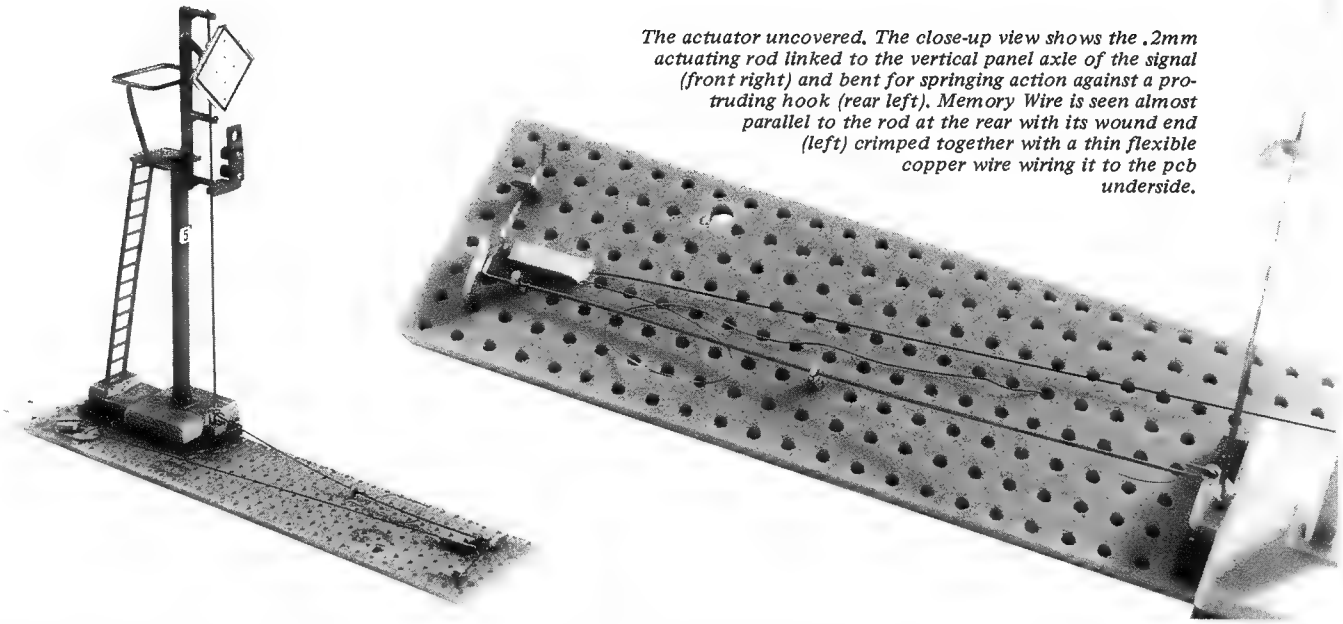
The first section generates a fixed 10V DC from any AC or DC output supplying a minimum of 12V. Connection to the second section is made through a manual action switch which may be replaced by a train-operated relay or any other automatic control. The second section is mainly composed of a Darlington amplifier supplying the Memory Wires. The transistor base is monitored by a dual R-C timing circuit. When the action switch is turned on, capacitor C begins to charge through R_1 and slowly open the Darlington gate. This lets the heating current rise in the Memory Wires at a moderate pace. The time to complete the process is proportional to product R_1 x C and one can vary the speed by varying R_1's value. When the action switch is turned off, the capacitor C will progressively discharge through R_2 and the transistor base, thus letting the heating current slowly decrease. Here the time is proportional to product R_2 x C and speed can be varied by varying R_2's value. The purpose of the resistor R_3 is to somewhat smooth the Memory Wire resistance variations between cold and warm states. Just to give you an idea, for a particular level crossing application requiring an active Memory Wire length of 75mm (in each actuator), I selected C = 1000 µF, R_1 = kOhm and R_2 = 1 kOhm. These values are causing a 10 sec start delay between the action signal and lowering motion (necessitated here by specific train operating conditions) plus approximate motion times of 3 sec. On the other hand, I selected R_3 = 22 Ohm (4W size!) versus a total resistance of both actuators in series amounting to 16 Ohm (cold)/12 Ohm (warm). By doing so, the relative resistance variation in the Darlington collector circuit between cold and warm states is reduced from 25% (Memory Wires only) to 10% (wiring including R_3).

A SIMPLER DESIGN

The standard actuator described above can be used with many different accessories including signals and semaphores. However, in several cases it may be interesting to develop a specific design more convenient for a particular model device. This was the case for an HO range of SNCF signals manufactured by MKD which I wanted to motorize for my own sake. I succeeded in developing an actuator so tiny and so inexpensive that it is worth showing you. The movable SNCF panels actually rotate in a horizontal plane but the same system could be applied to blade arms moving vertically, as usual in Britain, by replacing my horizontal crank with a vertical one mounted along the signal post. I am, of course aware of another British requirement which keeps modellers busy on your side of the Chunnel: prototypical



SNCF 'carré jaune' (mechanical distant signal) offered as a non-operating HO plastic kit by MKD, but here equipped with my tiniest Memory Wire actuator (1/87 figure shown for scale reference). The mechanism is protected by a white Plastikard cover, whose upper surface has been ballasted. Note the central groove allowing access to the actuating rod.



The actuator uncovered. The close-up view shows the .2mm actuating rod linked to the vertical panel axle of the signal (front right) and bent for springing action against a protruding hook (rear left). Memory Wire is seen almost parallel to the rod at the rear with its wound end (left) crimped together with a thin flexible copper wire wiring it to the pcb underside.

bouncing. Sorry, I have no new solution but the Memory Wire actuator won't be more complicated to adapt than a solenoid, I believe. The whole idea was to build a very flat box directly under the signal pedestal, so that all adjustments could be handled at the bench and the signal installed on the layout platform ready to perform. Thanks to the Memory Wire's thinness, it was not too difficult to come up with a self-contained mechanism only 3mm thick. The overall length amounts to 85mm (mainly due to the 65mm wire length) but this is not too critical, being parallel to the track. The photos show the resulting design attached to one particular distant signal (SNCF 'carré jaune' announcing a later stop signal).

The actuator only includes two movable parts, a Memory Wire segment and an actuating rod made from .2mm music wire, also serving as the return spring. They are mounted on a pcb section (perforated Eurocard board with parallel copper stripes turned to the lower side). With the actuating rod linked at 1.3mm from the signal pivot axle and the signal panel rotating 90 degrees, a 65mm long Memory Wire generating a little more than 2mm displacement is ample enough. The rod is guided by two eyebolts and its return position precisely stopped by a little brass ear. The rod end is bent rectangularly and retained by its own spring against a protruding hook. All the fixed parts are anchored in the pcb perforations and soldered to the copper side. One end of the Memory Wire is laced to an eyelet whose hole has been filed oval in order to allow a slight adjustment around the attaching screw. The other end is wound around the angled rod end and crimped together with a flexible copper strand connected to the pcb underside. Electrical connections are made via the pcb copper stripes. The voltage required for a 2 second motion is precisely 1.5V. The total cost, including Memory Wire, doesn't exceed £1.

FURTHER POSSIBILITIES

There is no doubt that Memory Wires have a wide variety of applications in our hobby. Their only limitation is the short distance they move. In some instances, classical actuators will remain preferable but Memory Wires open a new field of animation which are almost impossible with those. Just think of a 4mm scale figure lifting up a flag, or a carriage operating its doors at the platform. Two years ago, Märklin showed an HO electric engine with pantographs swinging up before moving off. Another small German firm showed 1/87 trucks with working tippers. The opportunity was also given to me, confidentially, to examine a complete range of turnouts equipped with Memory Wire actuators at the desk of a major German model railway manufacturer. They are kept hidden in order not to kill the existing range of classically-designed solenoid switch machines. I have not delved deeper into this particular application because I am pleased with Fulgurex/Lemaco DC motor mechanisms (which I acquired in quantities a long time ago) and with more recent American slow-moving motors like Tortoise and Switchmaster. Besides, on my layout, I like throwing turnouts manually! The purpose of this article is more to ignite your imagination than to list all the possibilities offered by Memory Wire actuators. I'll be happy to read about other applications proposed by British modellers, who are inventive and skilful by tradition. As you can see from this introductory article, most components you will need are common and cheap with the exception of the Memory Wire itself. As the manufacturer was not interested in the hobby retail market, I got his agreement to distribute it myself, so I am able to propose a complete starter pack including 1 metre of wire, Teflon catheter, various fittings and springs plus extensive instructions. To be fair, I must also mention the Californian firm Mondotronics which is very active in other markets (educational, robotics) and might soon have European distributors for their 'Flexinol' Memory Wire. This is probably good quality, but it is of the 'One-Way Memory' type and will not exactly suit the simple actuator designs I have described above. Return spring action will have to be reinforced and my tiny signal actuator will not be possible with One-Way Memory Wire.

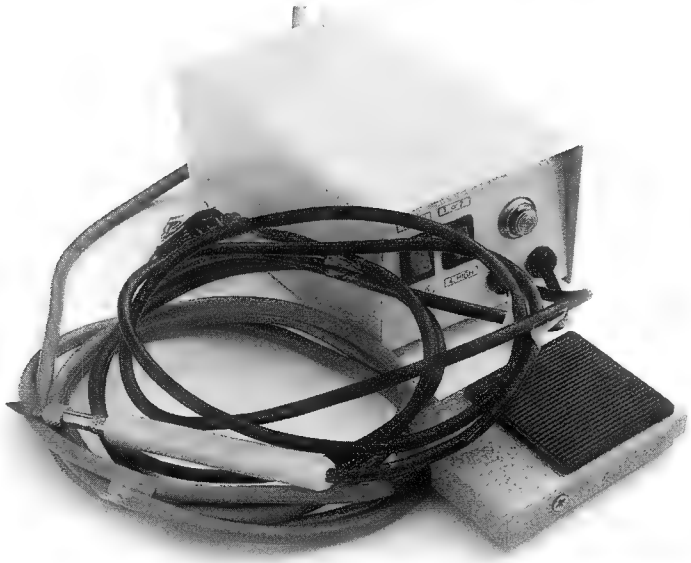
Good luck and enjoy yourself.

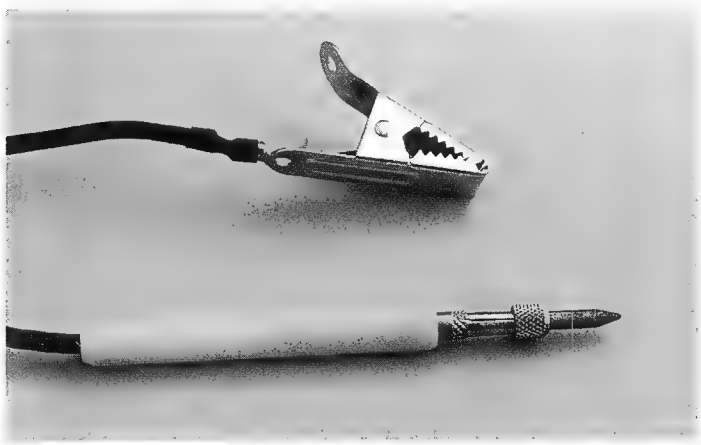
To help modellers who wish to try SMA, Jaques Le Plat has agreed to make suitable amounts of wire available. The prices shown are in Belgian francs (July 1994 exchange rate approximately 50Bf to £1) and includes EC VAT. Payment should be made in francs by International Postal Money Order to Belgian Post Account 000-1543565-04 or by Eurocheque (which any UK bank can arrange) payable to J. Le Plat at 4a, rue du Pont-de-Bois, B-1490 Court-St-Etienne, Belgium.

- ★ *Trial kit comprising 1 metre SMA wire, catheter, fittings and instructions cost Bf680 plus Bf65 post.*
- ★ *Plain wire: 1 metre Bf500; 5 metres Bf2000; higher quantities on application. Bf65 post per order.*

Resistance Soldering Unit

JOHN HAYES looks at a new arrival in the fast-growing market for resistance soldering gear:





Resistance soldering units have been around for several years now and most readers will, I am sure, be aware of their existence and capabilities. Exactoscale pioneered the use of these (certainly in the model railway field) about five years ago and there are several models now available.

This unit from GB Electronics Ltd is one of the latest to appear on the market and is a very competitively priced package. The transformer is a very compact unit measuring approximately 7in deep, 3in high and 4in wide, and comes fitted with a mains plug and footswitch. The earth and probe leads are of heavy-duty cable approximately 1 metre long. The earth clamp is good quality, as is the probe, which is of brass construction with a sliding clutch-type action to hold the 5mm carbon electrodes, and is fitted with a nylon handle. The probe and earthing clamp are permanently connected to the transformer.

Technical details are as follows: The unit operates from 240V 50Hz with built-in circuit protection. The output can be switched while in use to give three outputs:

1 low = 3.1 volts
2 medium = 3.4 volts
3 high = 3.7 volts

The unit has a 50% duty cycle (10 seconds on followed by 10 seconds off) with a capacity of 113 VA. A neon indicator on the front panel of the transformer is illuminated when the footswitch is used.

I think it should be stressed to those contemplating buying a resistance soldering outfit that as far as I'm concerned they should be treated as complementary to rather than a replacement for conventional soldering irons. For adding small etchings and components to models built from etched kits, they are unsurpassed, the big advantage being the time saved in cleaning up as solder is confined to the joint and not all around the parts to be fitted.

These days I am a full-time professional modeller and, although I would certainly not like to be without a resistance outfit, the actual time mine is used compared with a normal soldering iron is quite small. I therefore think this should be borne in mind before parting with money for such equipment.

So how did this model perform? In a nutshell, very well indeed. As I have said, I mainly use these for adding small components to basic models, i.e. wagon strapping, hinges and the like. The low power setting is perfectly adequate for the majority of this work, certainly in 4mm scale. The recommended method is to use a solder paint or cream applied between the parts to be soldered. I personally favour pre-tinning the parts on the etch fret beforehand using 188° solder and have found this gives generally better results, especially on the very small components. Either way, the unit works very well. In fact, the low setting on this unit gave a slightly slower heat-up than my own Exactoscale model which can be a bit fierce, especially on very tiny parts.

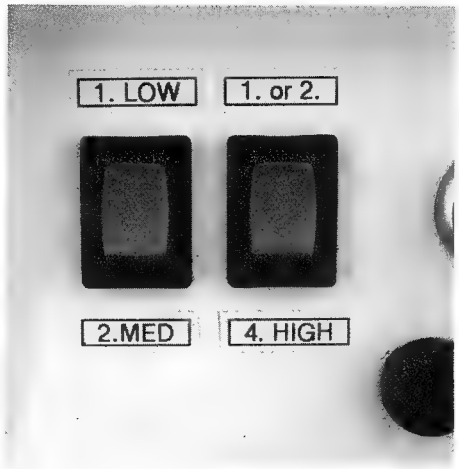
At the other extreme, the Exactoscale unit has a wider operating range. It also has six power settings against three on the review model and much more power at the top end.

To test the limits of this model I tried joining a piece of 1mm thick brass approx ¼in square to a small sheet of 1/16in brass sheet about 3in square using 188° solder paint. This required the highest setting and took approximately 8 seconds to heat up sufficiently to melt the solder. This is getting close to the 10 seconds maximum operation time recommended by the manufacturer but it does show the capabilities of the unit. To be honest, if I need to solder material of this gauge, I don't regard the resistance soldering iron as the ideal equipment to use. For the vast majority of applications in the smaller scales, this unit should be totally adequate.

Initially, I was a little confused with the labelling of the power selector switches. To use the two lowest settings, the right-hand switch has to be placed in the top position marked 1 or 2 and the left-hand switch is then used to select the desired range 1 LOW or 2 MED. To use the high power setting, the right-hand switch has to be set to the position

marked 4 HIGH. The instructions are not entirely clear on this, so perhaps a little diagram would help.

However, this does not detract from the performance of the unit which is excellent – it is just a question of getting used to it. The overall standard of finish is good and the use of high quality components coupled with a very competitive price makes this an attractive proposition for anyone considering a resistance soldering iron. Having used the review sample alongside my Exactoscale model for several weeks, I found it an excellent unit and would especially recommend it to anyone modelling in 4mm scale – in fact I intend to buy one myself for small detail work. However, for anyone working



in 7mm or over, the Exactoscale model may possibly be a better buy with its wider range of heat settings.

The unit comes complete as described for £70.00 excluding P & P or without the probe for £60.00. It may also be available in future as a whole or part kit. For a further £10.00 a work base is also available consisting of a steel sheet screwed to a plywood base and fitted with an angle back stop and earthing pillar.

To order this unit or for more information contact G.B. Electronics Ltd. via either: Barrie Fitch, 4 Canal Road, Yapton, West Sussex, BN18 0HA (Tel. 0243 553401) or Ray Hodson, 2 Mallard Gardens, Peel Common, Gosport, Hants. (Tel. 0329 236099).

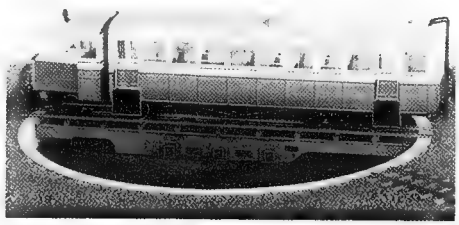
SMALL SUPPLIERS FORUM *continued from page 202*

The kit is all nickel silver and covers both loco and tender, with spacers for P4, EM and OO, plus full valve gear, lubricators, wheel weights and a variety of lost wax brass detailing parts. Cost is £22.50, or you can go for the chassis, a full set of body detailing parts (£10.50 separately) and a chassis completion pack comprising Romford wheels (for OO), axles, pony and tender wheels, five-pole Mashima motor, 40:1 gearbox and all the other fiddly bits (£31 separately), plus the Dapol kit at a bulk price of £66. It's another popular choice which will undoubtedly (and deservedly) do well for Branchlines. Proprietor Andy Mullins has also brought out yet another 4mm kit of an Isle of Man loco type – one of the Beyer Peacock 2–4–0Ts remoulded from the old GEM whitemetal kit masters plus a new chassis, completion and detail pack, £75. Address: PO Box 31, Exeter, Devon, EX4 6NY (0392 437755).

LONDON ROAD MODELS of 1 The Avenue, Romford, Essex, RM1 4DL (0708 761592) has issued two new 4mm loco kits – the LMS 3F Jinty at £59.50 and the LNWR 'Chopper' tank at £54.50. These are etched and cast and require motor, gears, wheels and couplings to complete. LRM has also acquired a range of 4mm cast brass detail castings which are being improved and extended with items from the range of kits. List in return for an SAE.

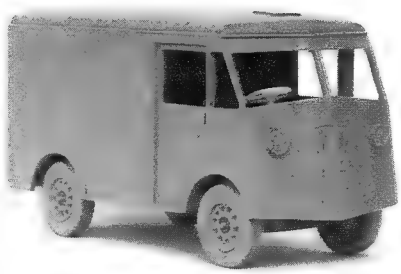
Within weeks of announcing that it had acquired the famous old PC range of Methfix and Pressfix transfers, the HISTORICAL MODEL RAILWAY SOCIETY has landed another prize – the entire artwork and film for the former PC range of etched brass 4mm scale name and number plates, which has not been on sale for a good 15 years. Although only single etched, requiring the modeller to cut them from the backing sheet, the PC plates were brand leaders in their day, and for a very good reason: all the letter and number shapes were hand drawn rather than originated from off-the-shelf dry print or typesetting founts, so they were (and remain) entirely authentic. So a bit of snipping and filing is a small price to pay. The downside is that they will only be available to HMRS members, who will shortly be circulated with a full list and prices. Non-members can get them in one of two ways: ask a friend who is already in the HMRS or do the sensible thing and join up yourself (details from HMRS, 9 Park Place, Worksop, Notts, S80 1HL, enclosing a large SAE).

We're grateful to Joe Brook Smith for drawing our attention to the Dutch Raboesch range of plastic profiles – round, half-round, quarter-round, square, hex, triangular and rectangular rod, round and square tube and half-tube, T, L, H. I and other sections in scores of sizes, many of them small enough to be suitable for our purposes. They are distributed to the model trade by J. PERKINS LTD of 90-96 Greenwich High Road, London, SE10 8JE and modellers can telephone for further information on stockists on 081 692 2451.



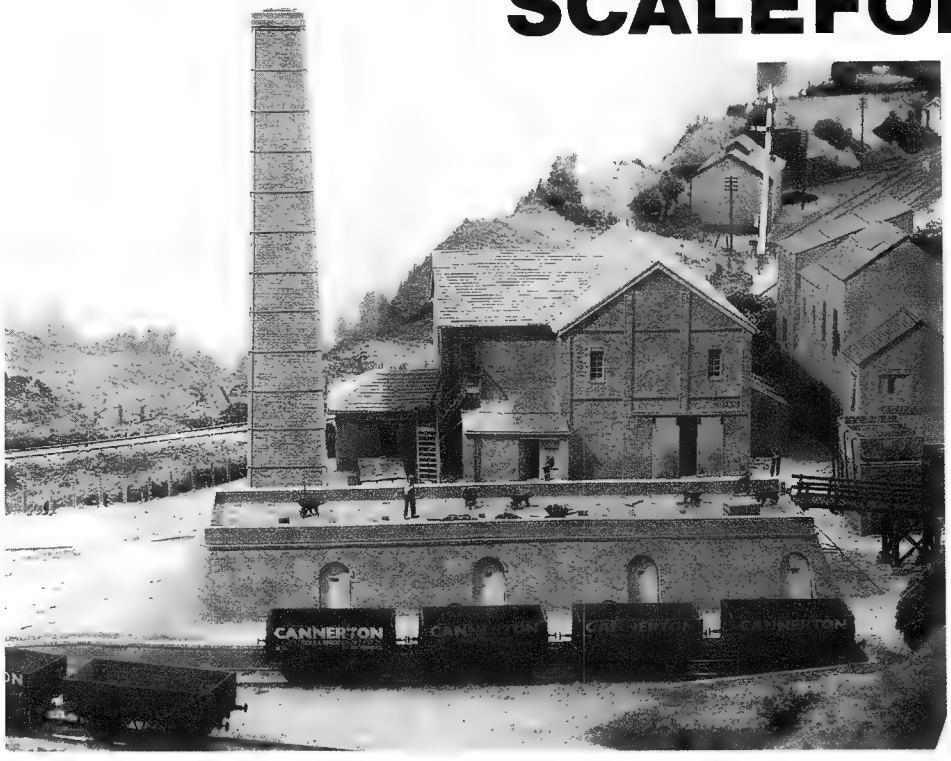
It seems like only a few months ago that Backwoods Miniatures came on the scene with a rather obscure 4mm narrow gauge kit, but it's actually 2½ years and the range now stands at 20-odd kits. These are mostly of Irish narrow gauge prototypes and this County Donegal Railway railcar No. 14 is a good example – an etched brass and nickel silver kit with cast details costing £68. It is shown here on a model of Killybegs turntable, the prototype of which was built from discarded Class 4 or 5 frames; this bizarre piece of equipment is also available as a kit, complete with a Peco pit, motor/gearbox and etched deck, price £52. Anyone interested in Irish narrow gauge should see the Backwoods list, which is rapidly filling with interesting items from the Clogher Valley Railway, Lough Swilly and Cavan & Leitrim as well as the CDR – a touch irresistible if you're not careful. The list is available from Backwoods Miniatures at 16 Reivers Gate, Longhorsley, Morpeth, Northumberland, NE65 8LA (0670 885 77).

TAYLOR PLASTIC MODELS, who have long been making kits and bits to improve British outline N scale models, have come up with some more nice things, including a kit comprising enough parts to detail a full Graham Farish five-car Freightliner set. This contains replacement wheels to lower the wagons to scale height, buffers for the ends of the rake, extended outer couplings and 10 of the most exquisitely fine curly-spoke brakewheels you're likely to see. The full set costs £15 post free. Also new are cast resin ends to represent the distinctive, angular lagged ends on the 100 tonne Class B heavy oil tanks; these are designed to fit the Farish 100T bogie tankers and come in the two most common types – shallow pointed cone and flat-centre cone. They cost £4 per pair post free from TPM at Unit 4/1 Enterprise Centre, Wardwell Lane, Newington, Sittingbourne, Kent, ME9 7BS.



Locotech, who recently produced an LNER Y9 loco kit for 7mm, have started a line in value-for-money 7mm scale road vehicles, starting with this utilitarian Morris Commercial delivery van, a very common sight on urban roads in the post-war years. It's cast in what Locotech call 'a plastic resin' and costs £8.95 from model shops or direct (plus £1 post) from Unit 51, Joseph Wilson Industrial Estate, Millstrood Road, Whitstable, Kent, CT5 3PS. More vehicles are promised to follow.

SCALEFORUM '94



Photographed in the unsympathetic gloom of last year's Scaleforum is this magnificent 4mm scale brickworks, built by Bob Logan and dominating a corner of the East of Scotland 4mm Group's layout 'Bonnybridge Central'. Using only simple materials, including brick-papers, he created an industrial diorama oozing atmosphere and a sense of time and place – a real attention-grabber, in fact. Indeed, it grabbed our attention to such a degree that we gave Bob the MRJ Scaleforum Chalice (and £25 cash that goes with it) – a little something to take back over the border after a triumphant first visit to the Home Counties!

LAYOUTS

Aberhafren: Steffan Lewis & Mendip MRG – The layout's name translates to 'mouth of the Severn' and is based on Aberystwyth around 1958/62.

Effingham South: Graham Clark – Real place, fictitious station in the town. An imaginary LSWR-built line set in the present day, rich in EMUs.

Grafton: Steve Lee – MSWJR as it was around 1910, set in deep winter. First appearance since completion of the branch to Dodsdown brickworks.

Mellin Quay: Ipsley Circle – Terminus of a GWR single line West Country branch in the 1920s.

Great Bardfield: Dave Hawkins – Essex in the BR steam period, a layout based on a fictitious extension to the Colne Valley & Halstead Railway.

Ehen Bridge: Mike Peascod (Society Chairman) – Terminus of a fictitious extension to the LNWR & Furness Jt. Railway's Ehen Valley branch.

Tolleshunt St. Johns: John Chambers – Unfinished Kelvedon & Tollesbury Light Railway might-have-been in the early '50s.

Newcastle Haymarket: Ian Futers – Another minimum space layout from Ian, North British in origin and redolent of the Haymarket area of the city.

Thursford: Ray Hammond – Double track M & GN main line station, 32ft long.

Ulpha Light Railway: Norwood MRC – The Furness Railway reached Ulpha by a freight-only branch from Foxfield, but the advent of the Light Railways Act in 1896 brought a passenger station.

DEMONSTRATIONS

Mike Grey, resistance soldering; Steve Banks, coach construction; Tony Hill, trees and scenery; Steve Barnfield, painting and lining; Dave Dunn/Paul Moore, etched and whitemetal kits; Tony Sullivan, track; Mike Sharman, bodger's clinic; Mike Hayward, signalling; Paul Bason, buildings; Geoff Kent, plastic wagon construction; Tony Wright, photography; Ian Hunter, kit conversions; Peter Tatlow, layout construction; Eric Pilgrim, advanced chassis construction; Gordon Hopkins, overhead catenary.

Lectures (including one on the Alex Jackson coupling), plus full trade support.

SCALEFORUM 1994

Saturday & Sunday, 26th/27th September
The Leisure Centre, Leatherhead, Surrey

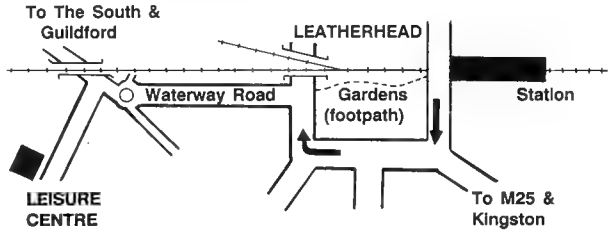
Saturday, 10.30 – 6.00, Sunday 10.00 – 4.30

Members £2.00, non-members £4.00

GETTING THERE

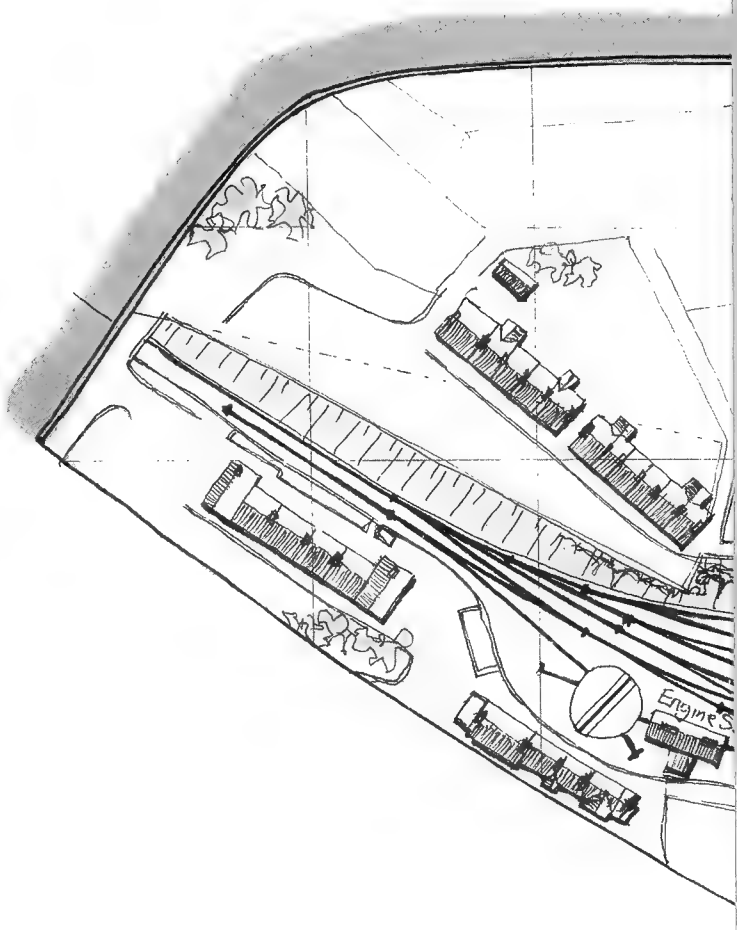
Leatherhead Leisure Centre is close to the railway station; twice-hourly Dorking trains from Victoria call at Leatherhead (from Waterloo, change at Epsom; Luton–Guildford Thameslink services for King's Cross for those from north of London).

The M25 is the best route for motorists. From Junction 9 follow signs to Leatherhead and then for the Leisure Centre. Free on-site car parking.



CONISTON

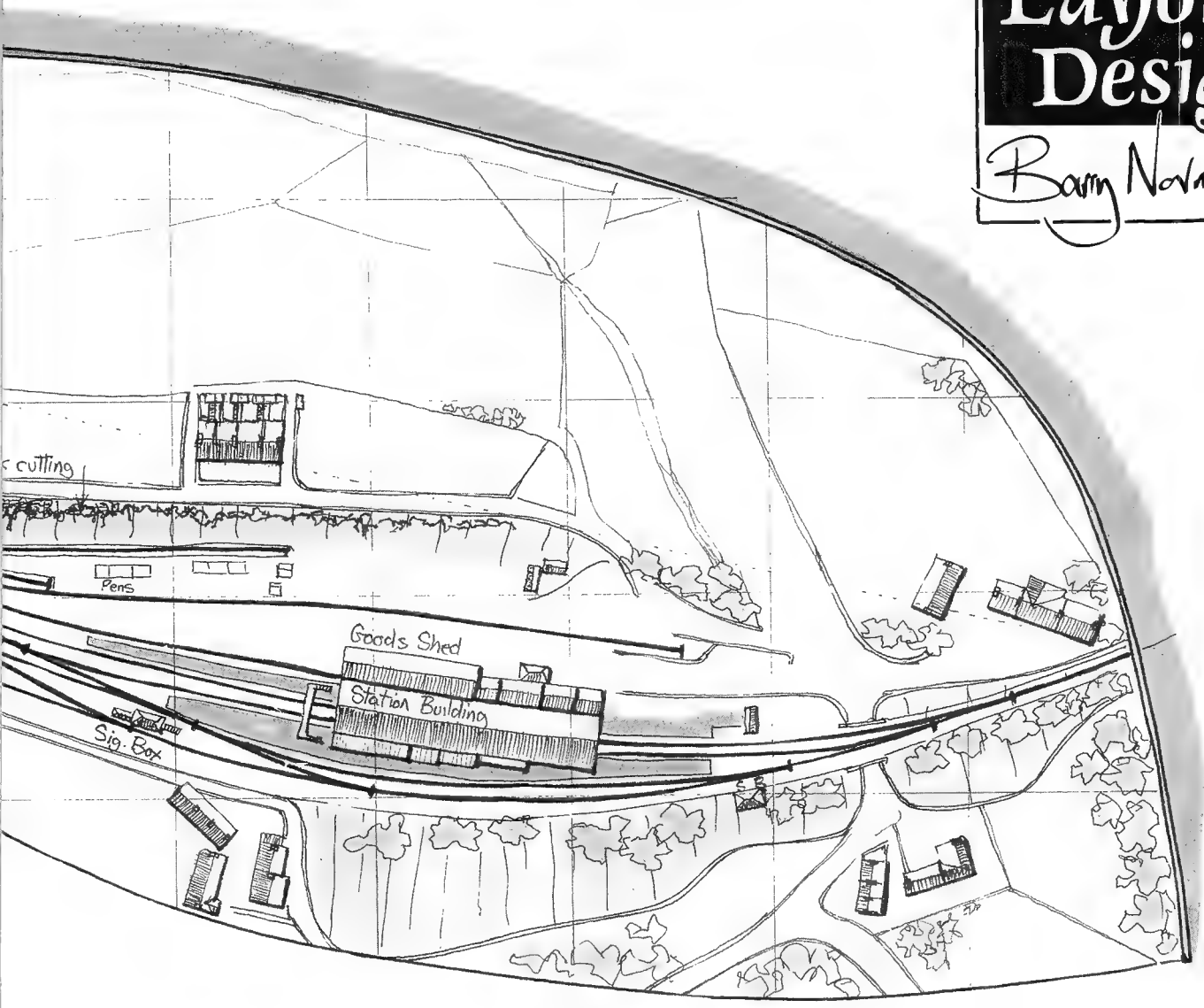
Set on a hillside above Coniston Water, in the shadow of the Furness Fells, lies Coniston station. This was an unusual station, at least from an architectural point of view, with its Swiss-styled train shed built from local Westmorland slate, elegantly poised above the town. I particularly like the magnificent portico which fronted the station approach and I can imagine the breathtaking views across the lake and towards the distant hills from the tea rooms. Yes, this was a station of distinction, grand in every way and obviously proud of its spectacular location. It also had a delicate wrought-iron footbridge crossing from one platform to the other, and a signal box with unusually exposed timber framework, picked out in a contrasting colour to the buff tones of its weatherboarding. A small stone-built engine shed accompanied the turntable, but, unfortunately, the neatly overhanging hipped roof was replaced in LMS days with a quite tasteless and inappropriate corrugated asbestos effort, at least from an aesthetic point of view.



Despite all this grandeur, train services to Coniston were simple. From the early days of

Layout Design

Barry Norman



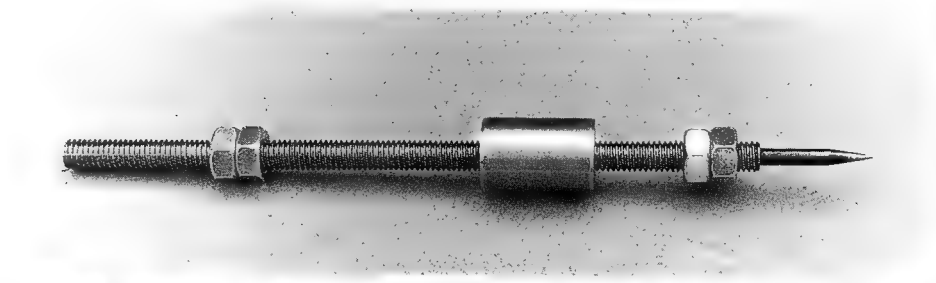
the Furness Railway, railmotors became the mainstay of passenger services. Initially, these carriage-like machines with their trailing four-wheeled coaches coped well with the traffic, but, in common with most other railways, these inflexible vehicles gave way to the more practical engine-and-two-coach motortrain. As the years passed, the FR 2—4—2T and 0—6—2Ts were replaced by L & YR 2—4—2Ts which themselves bowed out to Ivatt Class 2 2—6—2Ts in the 1950s.

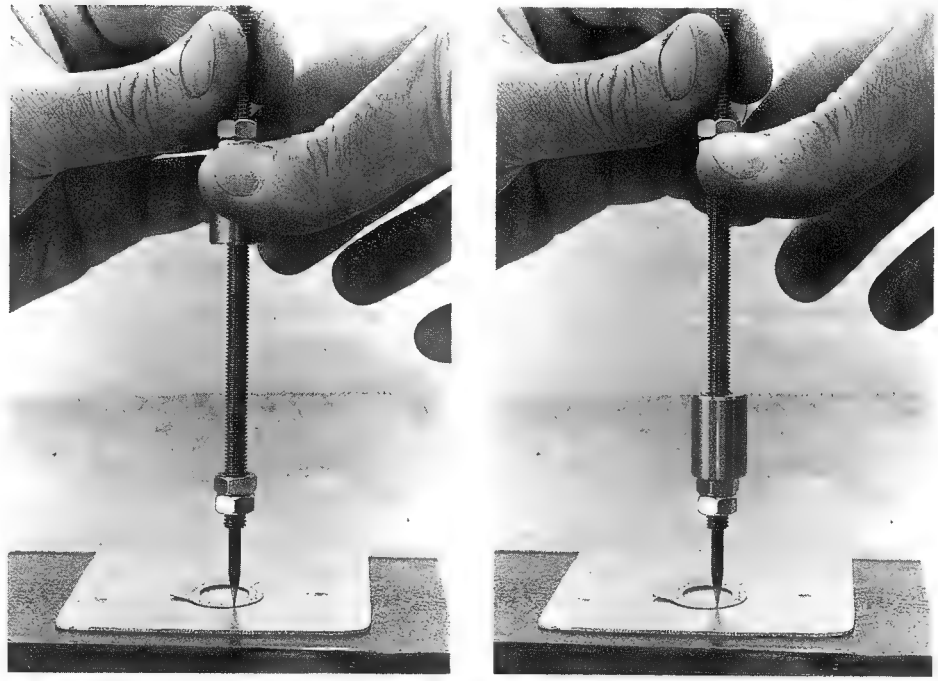
Although a branch line terminus (meeting the main line at Foxfield), it can be seen from the plan that a line crept out of the other end of the station; this led to some copper mines. Although little copper ore seems to have been carried after the turn of the century, in a model I would be keen to ignore the truth and develop the operating potential of this line. Similarly, it is unclear as to how much holiday and excursion traffic arrived at Coniston, but I'm sure that this should feature quite largely in a model, bringing an interesting variation of coaching stock to the lakes.

Undoubtedly this is a refined and magnificent station in a quite unrivalled location. It is a spectacular scene, and one that, in this design, I have tried to capture to the full. To me, the ideal scale to build this diarama would be 2mm, making a fine contrast to both 'Chee Tor' and 'Chiltern Green' (the grid is drawn for this scale). However, 4mm scale would not be impossible, for indeed I first planned this layout as a 4mm follow-up to 'Petherick'. Perhaps I should have built it!

Getting the drop on etched rivets

by JOHN HAYES





The weight is simply slid up the rod to the top stop and then dropped, giving even 'hammered' impressions every time. As you can see, the length of drop is adjustable so that trial and error should enable you to produce the optimum drop distance. These pictures show the tool in use. Left: *Weight held against the top stop . . .* Right: *. . . and released. It is best to start with a short travel and increase it as necessary.*

Most etched kits available today include parts with half-etched rivet detail which needs to be impressed by some means or another. The kit instructions invariably suggest using a blunt scriber or something similar but I have never found this method very satisfactory on two counts: first, it is not easy to maintain a consistent depth of impression, and, secondly, it invariably leads to distortion of the part being riveted. The best solution to these problems is to invest in a pukka riveting press, of which there are several on the market, but not everyone can justify the cost of one of these. With this in mind, my thoughts turned to producing a cheap and simple do-it-yourself version which would overcome these problems.

Basically, the tool consists of a rod with a point at one end, and a sliding weight controlled by fixed stops to give consistent rivet impressions. When used against a hard surface (aluminium sheet is ideal), it doesn't distort the components being riveted. The pictures should, I hope, make things clear.

Any material could be used and the dimensions are not critical. To keep it simple, I made this example from a length of 6mm steel studding (available from DIY stores) about 8in long. One end was drilled with an 1/8in dia hole about ½in deep in the lathe. If you don't have access to a lathe, this could be done quite easily using a power drill – just be sure to keep the hole straight.

The point is a short piece of 1/8in dia silver steel turned to a sharp point (see photo). This could also be made in the power drill using a file.

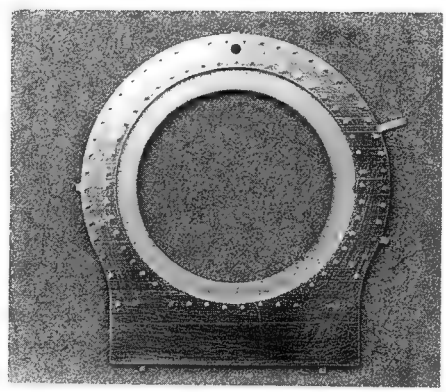
The point was hardened and tempered to give it longer life; silver steel is quite tough so even in its soft state it should last quite well.

Hardening and tempering silver steel is quite straightforward, the only requirement being a small propane gas torch. The first stage is to heat the point to a dull cherry red, then quench it immediately. This will leave the tip hard, but very brittle, so it will need tempering to give it toughness. To achieve this, first polish the point with fine emery to get back to bright metal, then carefully apply heat about ½in from the tip and watch the colours change and travel towards the point. As soon as it turns a golden brown, quench immediately. This happens quite quickly, so if you miss it, simply repeat the whole process again. By the way, this can only be done using silver steel; mild steel needs a much more complex process for hardening and is outside the scope of small scale railway modellers.

The last part to make is the sliding weight, in this case a 1in length of 5/8in dia brass drilled through to give an easy sliding fit on the studding.

The point is held in place with a spot of contact adhesive to allow easy removal should the need arise, two 6mm nuts are locked together close to the bottom, the weight slid on and another pair of nuts fitted to give an adjustable stop for the weight.

I have found the best results are achieved using a piece of aluminium sheet on a small steel block. The steel gives a solid base and the aluminium is soft enough to allow the rivet to be formed in the brass.

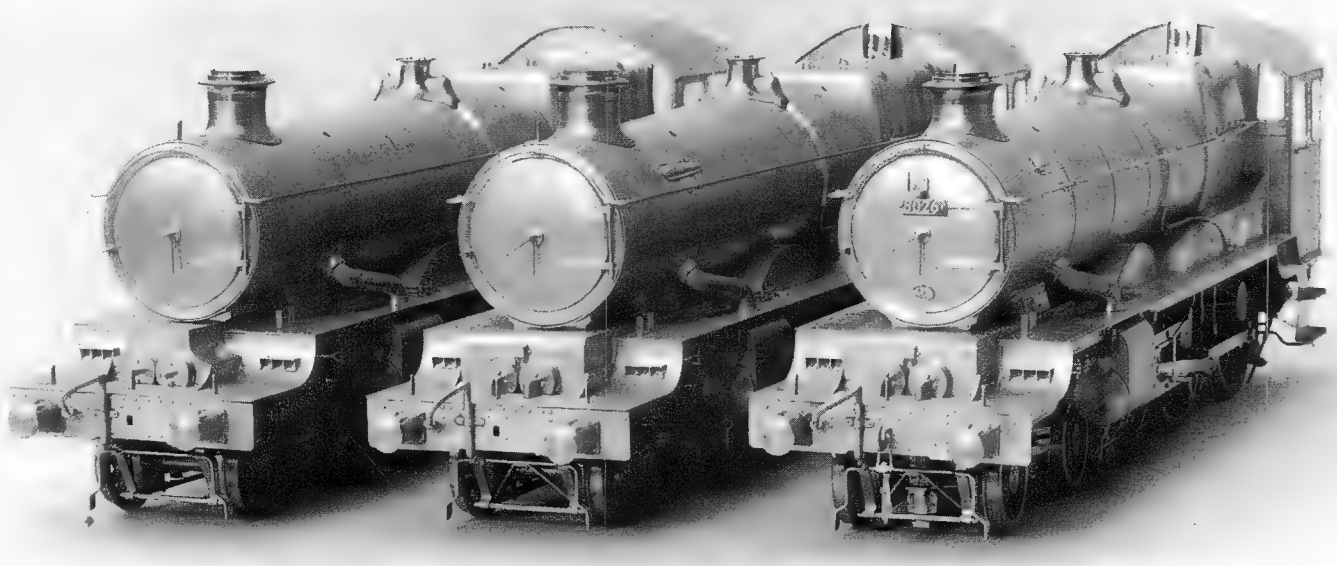


Results obtained using this tool.

As can be seen in the picture, the end result is quite acceptable and meets the two main criteria, i.e. consistent size rivets and no distortion, all for about 50p and less then an hour's work. Now that can't be bad, can it?

THREE CASTLES

TONY REYNALDS has to build 7mm engines for people who are very particular about period and condition, as these three different examples of the same class demonstrate. Here, he passes on some advice for anyone contemplating a 'Castle':



The engines in unpainted condition with some minor details still to be added. The diagonal strengthening struts on the later bogies show up well here. Photo: ANDREW FIELD. Photos of completed models: TONY SMITH

One of the most difficult and time-consuming things to do is to research a particular loco to ascertain the condition in which it was running at a given time of its service. This can be an extremely frustrating business, particularly for a professional locomotive builder like myself. Clients often want locomotives that they are familiar with or have performed some particular feat, or even a model of the engine that pulled the train that took them on honeymoon (mine was a flippin' diesel!). Having chosen the loco they would like, it is often left to me to do all the research. Tracking down photographs of a loco as it was running in 1930, for example, is not always easy, even with locos that are supposedly as well documented as the GWR 'Castle' class, so I offer these few notes for anyone who is contemplating building a 'Castle', especially as there are a couple of kits now on the market, notably from Malcolm Mitchell, who produces both a 4mm and 7mm version, and I believe there is also a 7mm kit from Oakville.

The three 'Castles' that I have recently completed are 4083 *Abbotsbury Castle* c.1934, 5015 *Kingwear Castle* as built in 1932, and finally 5026 *Criccieth Castle* which was built in 1934 but was to be depicted as running under British Railways c.1955. (Actually, I made a set of parts for a fourth loco for a client who was going to assemble them himself, but in the event I ended up putting the body and chassis together myself, and he is now going to do all the detailing.)

Originally, I was going to keep *Abbotsbury Castle* for myself as a showpiece and had chosen this one simply because, coming from an earlier batch, it had significant differences to the other two and I also had a good clear photograph which is always a big help. However, when another client saw it under construction, I was persuaded to finish it for him!

The original 'Castles' were developed from the 'Stars' in 1923 and the first one was 4073 *Caerphilly Castle* which is now preserved in the Science Museum in London, albeit with quite a lot of differences from when it was first built, including a boiler from a much later date. However, this was not at all unusual as boilers were interchanged all the time.

Several batches of engines were built between 1923 and 1927, but the most significant changes came about with the building of 5013 *Abergavenny Castle* in 1932. I have two official drawings of the 'Castles'. One is for the first batch, 4073 onwards (see *GWR Journal* No. 1), and a second drawing of the 5013 batch onwards.

Throughout their lives the boilers did not change much outwardly except for the likes of superheating, etc. in later days, but there were quite a few detail differences over the years, and it is this aspect I will concentrate on. These notes are not meant to be the definitive discourse on 'Castles' but just a few general observations on the class as a whole and in particular where they affected the engines I was portraying in their respective periods.

FRAMES

As built, locomotives 4073-92 had joggled frames at the front end to clear the leading bogie wheels. From 4093 onwards, the frames were straight with a dish indentation to clear the wheels.

On the model of *Abbotsbury Castle* the frames are made from scale thickness nickel silver (.031in) for 1¼in thick frames. These were joggled in a small home-made bender which I use for forming things like tender flares and corners. The material is clamped between two bars, the top one radiused to the bend required, whilst a hinged outer bar rotates upwards and bends the material cleanly round the top former. I believe

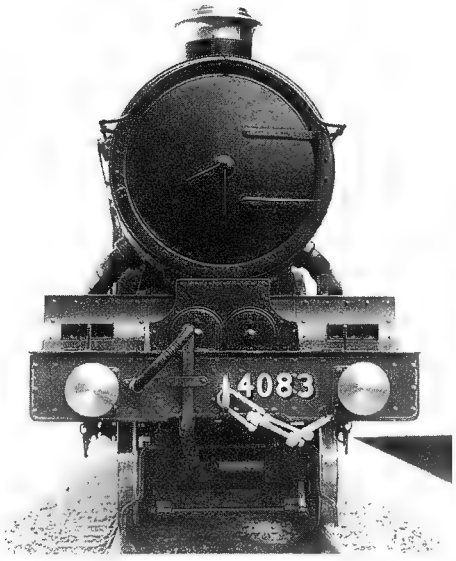
the S7 group are now marketing something similar.

The other two locos have straight frames with the dish shape pressed in a simple tool, both left-hand and right-hand frames being pressed together. The tool is turned from 2in diameter brass and is showing no signs of wear after pressing eight frames in the bench vice. I did anneal the metal in the area of the dishing to make it easier to form and, to my surprise, it worked first time.

The radius of the dishing is much larger than the radius of the wheel and is struck from a different centre to the wheel axle and this is reflected in the models. I wasn't sure how effective this was going to be when the models negotiated tight curves, and I was afraid that the bogie wheels were going to touch the frames and cause a short, so I insulated all the wheels on the loco and tender so that the chassis was electrically dead. In practice, during running trials, the bogie wheels did touch the frames on anything less than a 6ft radius curve, but, as I had incorporated side control springing in addition to compensation, and a measure of downward springing on the central bogie pivot, no problems were evident. However, I did allow rather too much up/down movement on the bogie axleboxes which caused the bogie to lift slightly on tight curves at speed, but a limiting screw on each axlebox soon cured the problem.

Above the footplate at the front, the 4073-92 batches had the narrow (because of the joggle) inside cylinder cladding irreverently known as the '7 rivet Vauxhall front' because of its resemblance to the old Vauxhall car radiator, seven being the number of rivets across the front face at the top. Nos. 4093-5012 had straight dished frames and so the cladding was widened but this still retained the 'Vauxhall' front, this time with nine rivets across the top. From the 5013 batch onwards, straight frames were used but with a simplified cover arrangement with no scooped-out sides. The top front edge was radiused and later modified with a piece of chequer plate bent to an angle and welded in place to make for safer footing for shedmen when they shovelled out the smokebox char, etc. On some locos a further larger piece of chequer plate was fitted to the top of the cover as well.

The inside cylinder valve spindle cover on the front of this cladding was a simple protrusion up to 5012, but then from 5013 onwards it was continued



The front end of Abbotsbury Castle, *showing the 7-rivet 'Vauxhall' front (see text).*

In many ways the British Railways version of the 'Castle' class is the most interesting to model as there is a lot of extra detail like mechanical lubricators, etc. Criccieth Castle *is portrayed as running in 1955. She was fitted with a double chimney in 1959 which no doubt improved performance but visually, in my opinion, it was an abomination.*

down to the footplate level and this is slightly more difficult to model. If you want to be authentic, please do not polish these covers on your models. I have only found one loco with polished covers, and that was *Windsor Castle* which was used for royal duties.

On the earlier batches up to 5012, the driving wheel springs had an equalising beam system which is visible from the side, but this was discontinued from 5013 onwards in favour of much more flexible individual spring units to each axlebox.

According to the RCTS *Locos of the GWR Part 8*, the equalisers were removed by the early '30s, so all three models have individual springs which are much easier to represent. I produced my own casting for the spring and hangers in whitemetal and soldered them to the chassis.

WHEELS

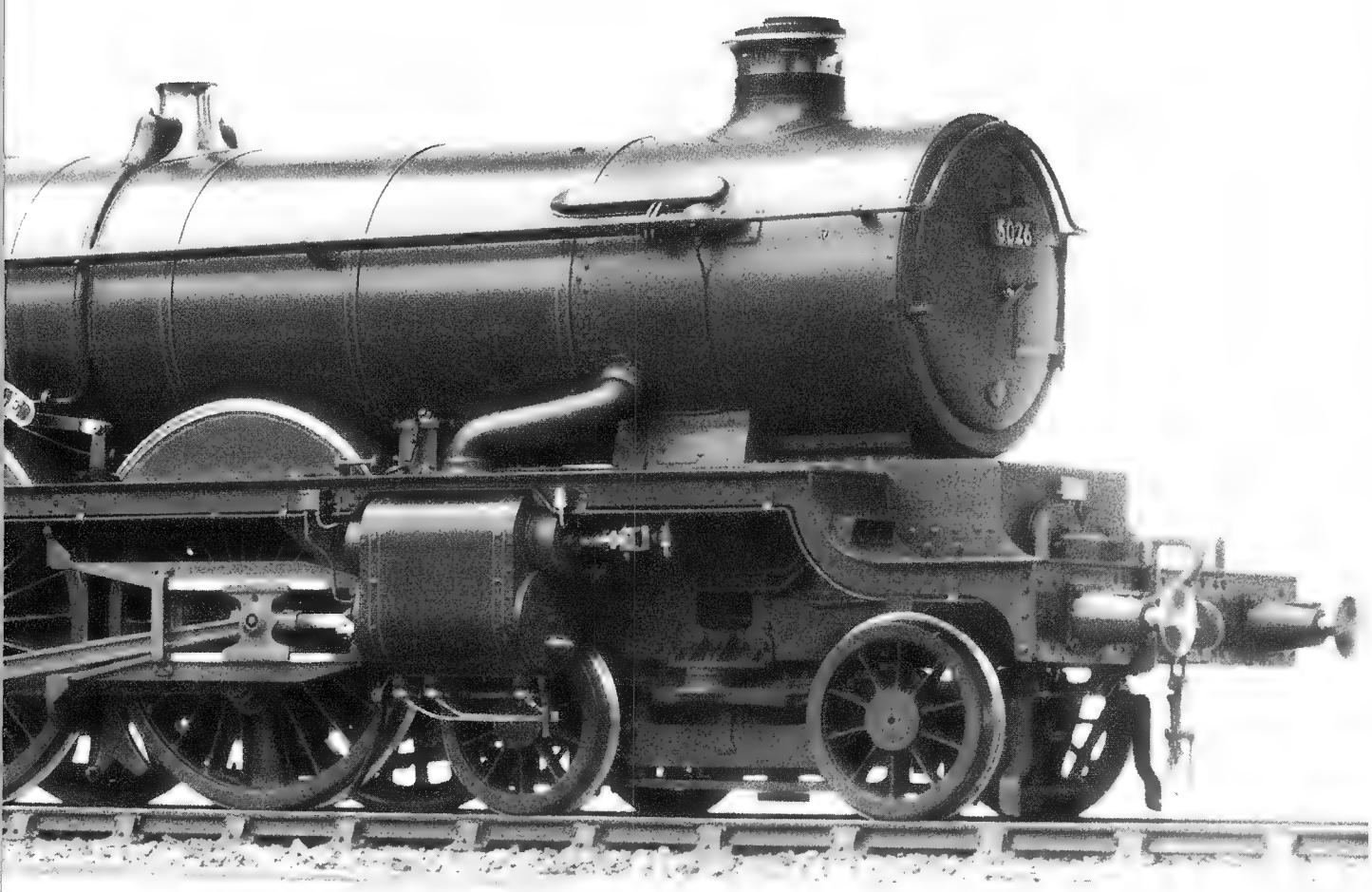
There are two types of wheel castings on 'Castles'. The original batches had the 'Star' type of wheel with the crankpin in line with one of the spokes. From 5013 onwards, the wheels were beefed up, similar to the 'Kings', with the crankpin between the spokes and a reinforcing web between them. Both types are available in 7mm from A.G.H. Miniature Engineering and these are the ones I used, whilst in 4mm scale Ultrascale do a 'Star' type, and I believe the heavier ones are in preparation and should be available soon.

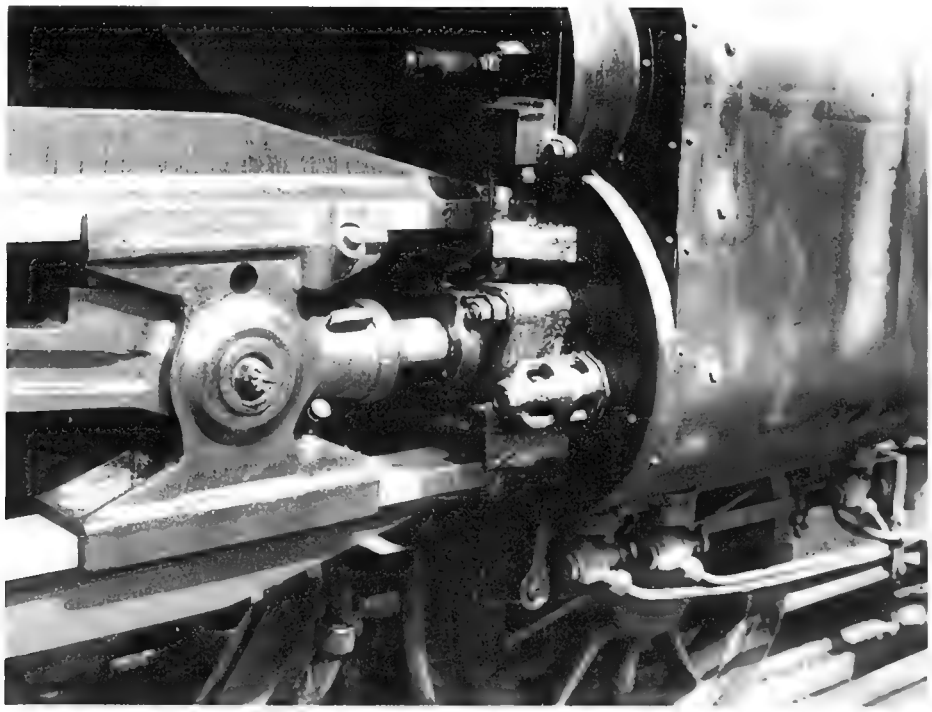
According to the photographs I have studied, balance weights differ. The early wheels in general had weights covering three spaces on the leading wheels, three spaces, but with a much deeper weight on the middle pair, and two spaces on the rear pair. The later wheels had longer and deeper weights covering two and sometimes three spaces on the leading wheel – five and sometimes six on the middle, and three or sometimes four on the trailing one. If you're fussy, it will pay to check the photo of your chosen prototype. As time went on, all these wheelsets appear to have got mixed up and it was possible to see early wheelsets on later engines and vice-versa. At least two preserved 'Castles' to my knowledge have a mixture of both types of wheel on the same engine!

COUPLING RODS AND CROSSHEADS

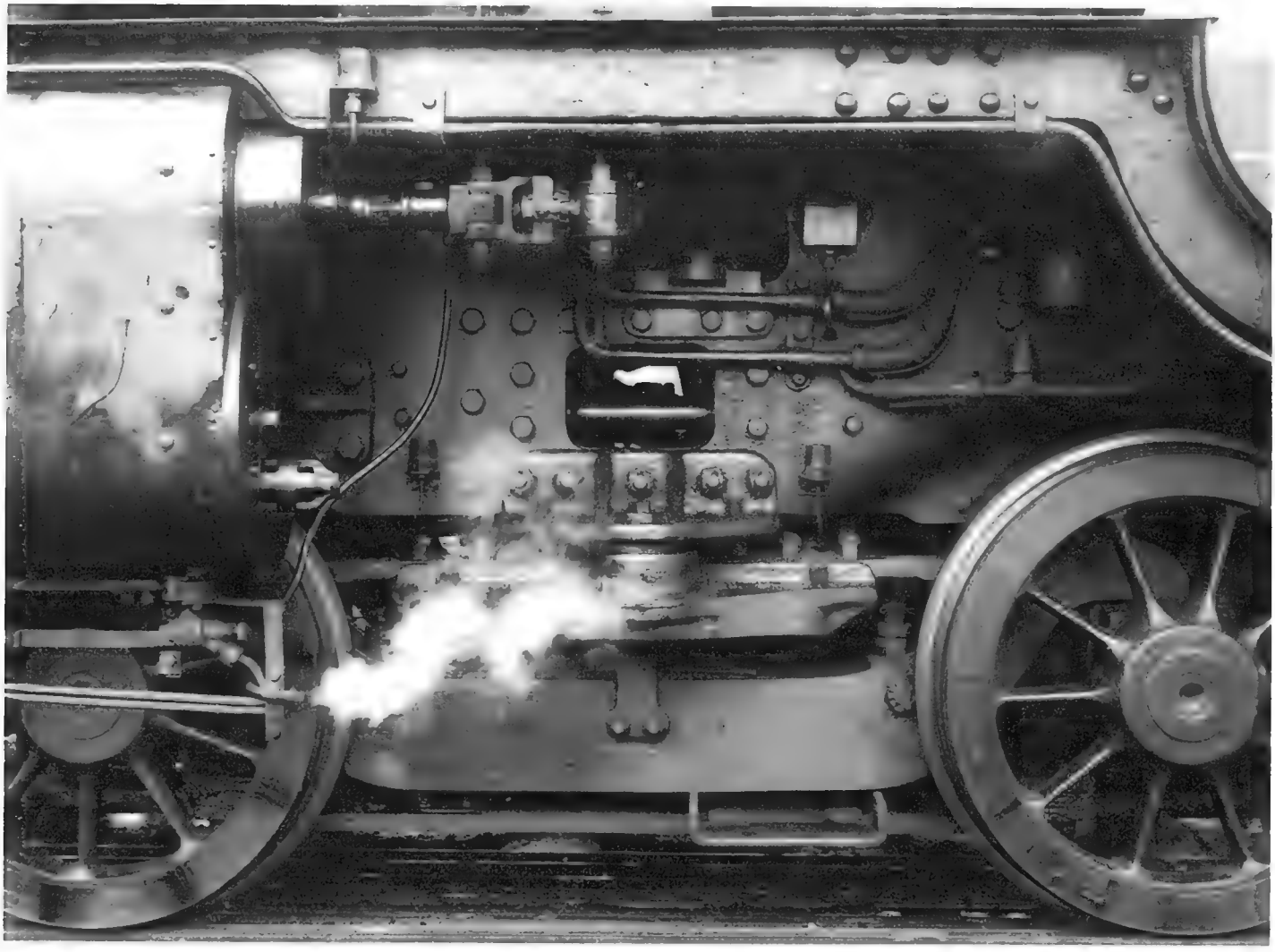
The early batches had the coupling rod joint in front of the crankpin on the middle drivers but this is obscured by the connecting rod, which is rather a nuisance when you go to all the trouble to make the forked joint properly. From 5013 onwards, the joint was moved to the rear of the crankpin in clear view, enabling the fitters to remove the rear part of the rod without having to take down the connecting rod.

The crossheads on the early types were built-up affairs with four bolts holding them all together. I have done a similar sort of thing on *Abbotsbury Castle* with the top and bottom slippers made separately and then fixed into slots milled in the central portion, with dummy bolts going through both parts. The later locos had plain one-piece cast steel crossheads.





Detail photos of the prototype can sometimes prove elusive, so photos like this, of 5038 Morlais Castle, *help enormously to capture the atmosphere of a particular locomotive. Some of the details to note are the small step fitted to the bogie on some 'Castles', the lagging on the pipes to the vacuum retaining valve above the leading bogie wheel and the additional brass oil box above them, again not on all the engines in the class.*



VALVE SPINDLE/PISTON ROD/GUIDE BAR LUBRICATION

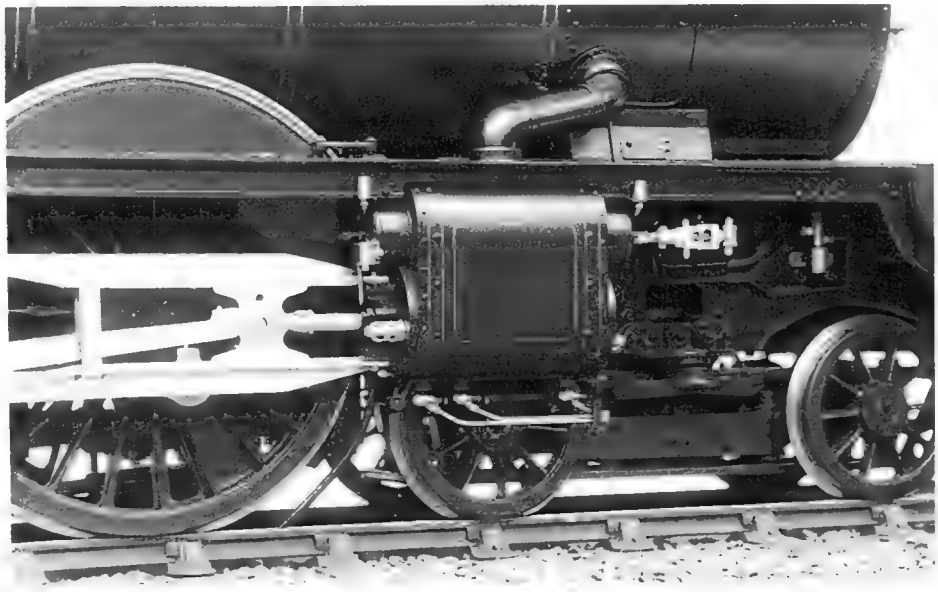
This is something that is different on each model. Originally, engines up to 5013 had simple brass cylindrical oil pots attached to the cylinder cladding above each valve spindle nearly out of sight behind the footplate valance. Slide bars had a rectangular steel pot bolted to the outside of the top one, and another smaller one bolted close to the cylinder to lubricate the piston rod gland. The crosshead was also fitted with a small rectangular steel pot above the pin to lubricate the small end bearing of the connecting rod. The later connecting rods had the ends modified to provide a reservoir for oil and this can be clearly seen extending beyond the back of the crosshead. This facilitated the removal of the outer oil box on the crosshead. There was one small reservoir incorporated into the crosshead bottom slipper to lubricate the bottom slidebar. The later one-piece cast crosshead incorporated oil reservoirs in both top and bottom slippers, dispensing with the rectangular oil pot on the side of the top guidebar.

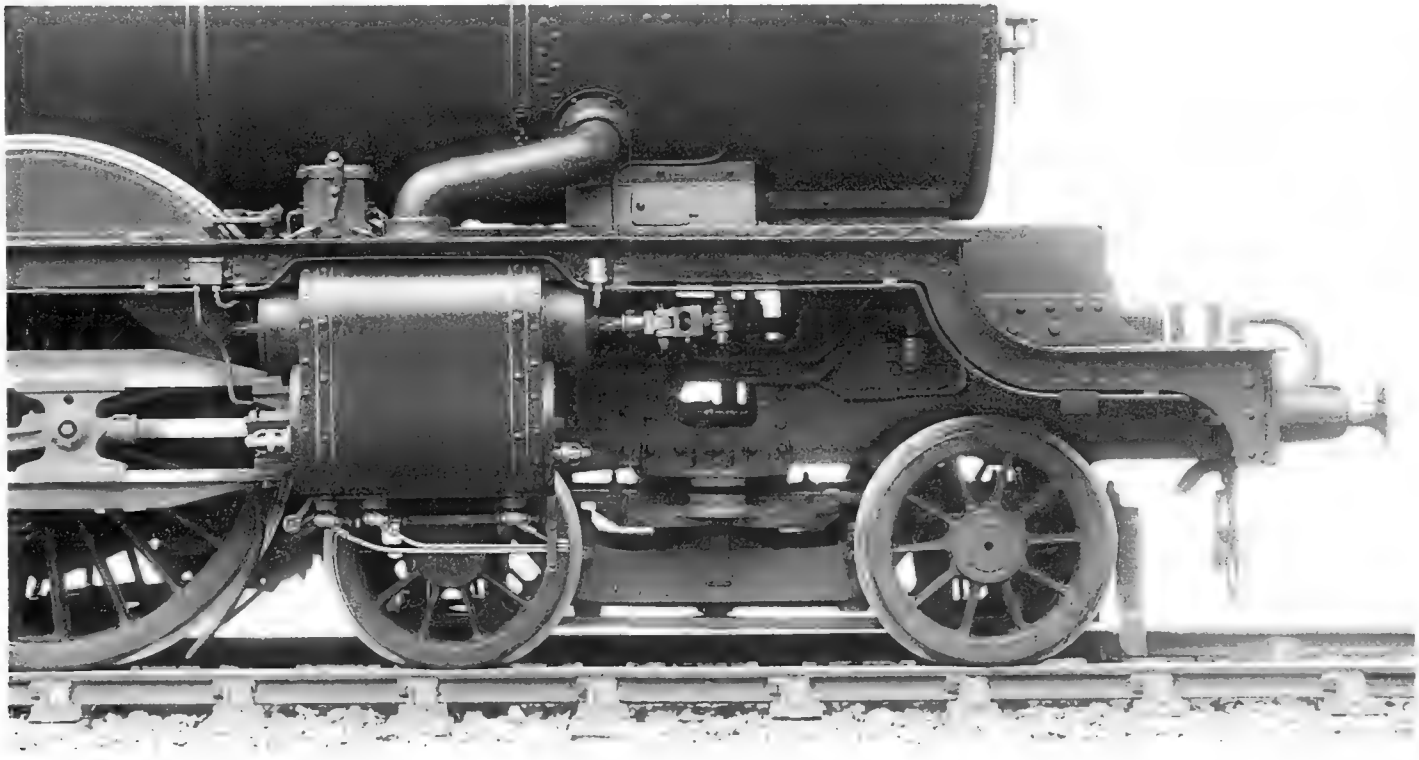
From 5013 onwards, a sheet steel bracket was provided on the rear of the piston rod cover to hold a rectangular brass oil box with a hinged lid. The bracket was also continued upwards to hold one of the cylindrical brass pots outside the valance. The front valve spindle was also bracketed out to the face of the valance for easier topping up of the pots with oil. Copper pipes ran from each pot to its lubrication point.

The third modification to the valve spindle/piston rod lubrication was to fix a brass rectangular pot to feed the rear valve spindle and piston rod glands, onto the side of the valance at the rear of the cylinder. This can be seen on the model of *Criccieth Castle*. The front valve spindle pot remained unchanged.

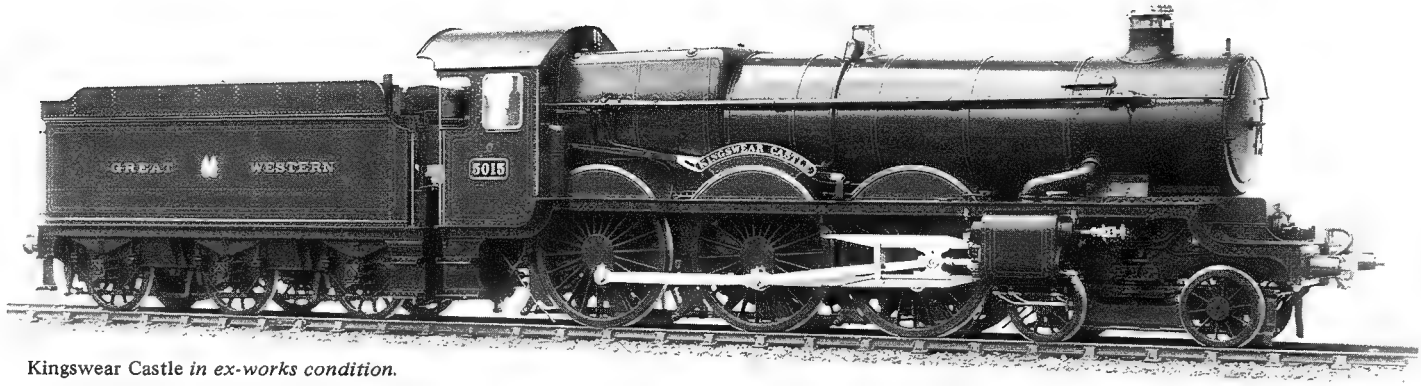
CABS

When the two GA drawings mentioned earlier are compared, there is a subtle variation in the construction of the cabs. In the 4073 drawing, there is a 1½in angle on the *outside* of the spectacle plate, to which the cab side sheets are riveted. This means that the spectacle plate was set back from the leading edge of the cab





The front ends of Kingswear *and* Criccieth Castles *to compare the different cylinder lubrication.* Criccieth Castle *was fitted with an ATC shoe under the bogie, hence the conduit pipe running along the valance.* Kingswear Castle *was fitted with ATC under the cab.*



Kingswear Castle *in ex-works condition.*

sides and a split brass tube fixed over the protruding edge. On the 5013 drawing, this angle is removed to the *inside* corners of the cab and the spectacle plate is brought forward to suit, although there was still just enough overhang of the cab sides to hang the brass beading on. It has been well documented that in BR days the brass beading was removed from all 'Castles' up to 5012. Now here is a puzzle. When I was looking at *Caerphilly Castle* in the Science Museum, I noted that the cab beading had been removed and the angle was on the inside, leaving the spectacle plate level with the leading edge of the cab sides. There is no doubt in my mind, and this is supported by photographic evidence, that when built, *Caerphilly Castle* had the angle outside, as did all the early 'Castles'. So why the modification? Surely it wasn't just to gain 1½in on the inside of an already roomy cab? I shall be very interested if anyone can throw any light on this. However, before anyone points to the drawing of the boiler fittings and cab in *GWR Journal* No. 1 and says that the angle is inside the cab, I should point out that although the drawing is labelled as 4073 class, the date of the drawing is 1932 and refers to the 5013 batch onwards.

DRAWINGS

A few notes on the drawing in *GWR Journal* might also not go amiss here. As drawn, the wooden cab floor is drawn 3in too high and, although the marked dimensions are correct, the seat is drawn correspondingly too high. If, like me, you have to scale off the drawing, it is better to use the boiler mounting drawing below the main one. To those people who throw their hands up in horror and say you should never scale off a drawing, my answer is that not every part of a General

No. 5026 has been lightly weathered and shows the rear external sandboxes and 'working' speedometer which is actually bracketed off the chassis on the model.

Arrangement drawing is dimensioned. Take, for instance, the cab window frames. If you haven't got the separate official Swindon drawings for that particular style of window frame, what else can you do but measure the General Arrangement? The *GWRJ* staff are very careful to get the drawing to a recognised scale and this is usually 7mm or 12mm. Any dimensions on the drawing are used to check that the reproduction really is to 7mm scale or whatever. So I quite happily get my scale rule out and measure away. Incidentally, if I might be allowed a small plug here, the new range of stainless steel scale rules manufactured by CPL Products of Newbury has proved to be extremely useful in this respect – I don't know how I managed for so long without one.

A few other things to be noted from the comparison of 4073 and 5013 drawings is that the numberplate position was dropped by 3in on the series 5013 onwards. In the 4073 drawing, the plate is bisected equally by a line struck from the tops of the splashers, whereas on the 5013 lots, the line would pass over the tops of the numbers.

The steps on the curved drop at the front of the running plate are shown having three ribs, but I have never seen this in any photos and four ribs seem to be the norm.

There are two round windows in the spectacle plate but this was on the first ten engines only and they were later plated over. On the early batches, the top feed pipes came straight down from the safety valve and kinked down to disappear inside the frames behind the middle splasher, but from 5013 onwards the pipes bent at right-angles level with the tops of the splasher and continued over the top of the middle splasher behind the nameplate before curving down to disappear through the running plate.

The washout plugs on the side of the firebox on each drawing are shown in different positions – don't ask me why. Fire-iron tunnels were fitted as standard from 5013 onward but the rest acquired them as time went on. Incidentally, the top sheet on the tunnel goes right back to the firebox cladding with a small angle bolted on the top sheet and the cladding for reinforcement. I've seen a few models that haven't quite got this right.

Lamp brackets were removed from the top of the smokebox to the smokebox door with the 5023 batch in 1934 and all previous locos were modified to suit by 1935 (RCTS Part 8). This was done quite quickly. Whistle shields were fitted to all

new engines from 5000 in 1926 and all the rest were done by 1936. They were not quite so quick with that one!

Speedometers were fitted from 1935 onwards although 5003 and 5008 had them fitted in 1933 and 1934 respectively.

SANDBOXES

The 4073 series had sandboxes feeding the leading drivers and the middle pair. The middle boxes were situated inside the frames, right next to the vacuum cylinder and must have been a nightmare to fill as access was severely limited. Nos. 5013 onwards came out with the leading boxes retained but the central ones removed to the underside of the cab floor and only the delivery pipes were visible. From 1937, Nos. 5060 onwards had external sandboxes fitted to the frames, just forward of the cab steps, and many of the earlier locos were subsequently fitted with these boxes at a later date.

DAMPER CONTROLS

On the earlier engines, damper controls were simple inverted L-shape handles coming through the cab floor just to the left of the firehole door, but from 5013 onwards, up to and including 5059, a different system was employed. This consisted of a small rack of levers in the left-hand corner of the cab. External evidence of this can be seen on left-hand views of locos where a bracket extended downwards 12in from the valance, just 6in in front of the cab steps. This was the bearing bracket for the operating rods and levers that went up to the rack in the cab. However, this practice was discontinued with the advent of the rear external sandboxes, and on subsequent batches the levers reverted to the old type. By BR days, many of the locos had acquired rear external sandboxes which would have fouled the rack system although some did survive with it right up till the end of their lives.

The front end of No. 5026 showing the steam pipe to the cylinder, which is most difficult to model correctly. Note also the chequer plate on top of the inside cylinder cover – a later safety feature.

EJECTOR PIPE

On earlier locos, where the ejector exhaust pipe entered the smokebox on the right-hand side of the boiler, there was a two-bolt lozenge-shaped flange, but from 5013 onwards this was supplemented by a ball-shaped water trap. Consequently, the flange joint was moved back to allow the trap to be inserted between it and the elbow into the smokebox. This trap also had a drainpipe which ran down the smokebox, along the saddle and down through the running plate.

BOGIE

The bogie on the 5013 onwards series was a heavier version of the earlier standard bogie. The main difference as far as modelling is concerned is that there was a pair of diagonal struts inserted at the front end, going from the side members up to a point on the central cross member — all clearly visible from the front. Also on these bogies there was a spring limiter bracket bolted to the outside equalizing beam at the midpoint between the two wheels.

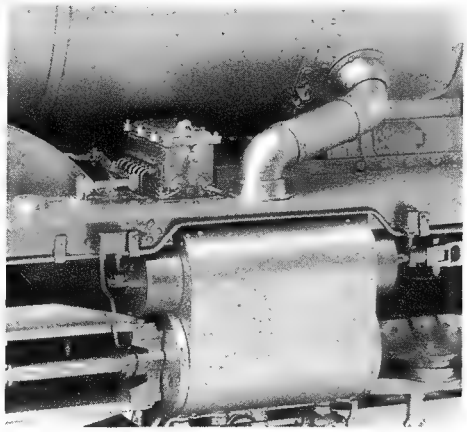
CHIMNEYS

A shorter chimney was introduced in 1937 and generally fitted to all locos built after that date although with boiler changes the taller chimneys could be found on various members of the class into the mid-1950s.

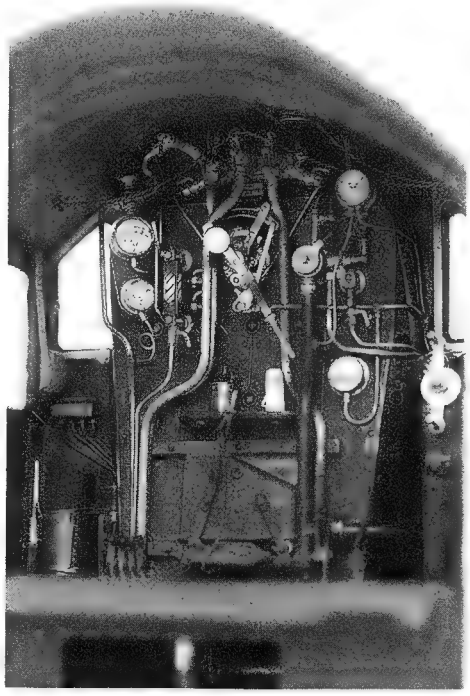
CYLINDER LUBRICATION

My model of *Criccieth Castle* has been fitted with a 3-row superheater boiler and mechanical lubrication to valves and pistons, as it was in 1955, just before it was fitted with a 4-row superheater boiler with nasty looking BR steam pipes and double chimney.

Mechanical lubrication was something that I hadn't encountered before on any of my models and I was somewhat hazy about it. I couldn't find a drawing of the lubricator box itself, so a phone call to Paul Karau pleading for information prompted him to go down to Didcot GWS shed in the pouring rain to measure up the one on the preserved 'King'.



Mechanical lubricator on No. 5026.

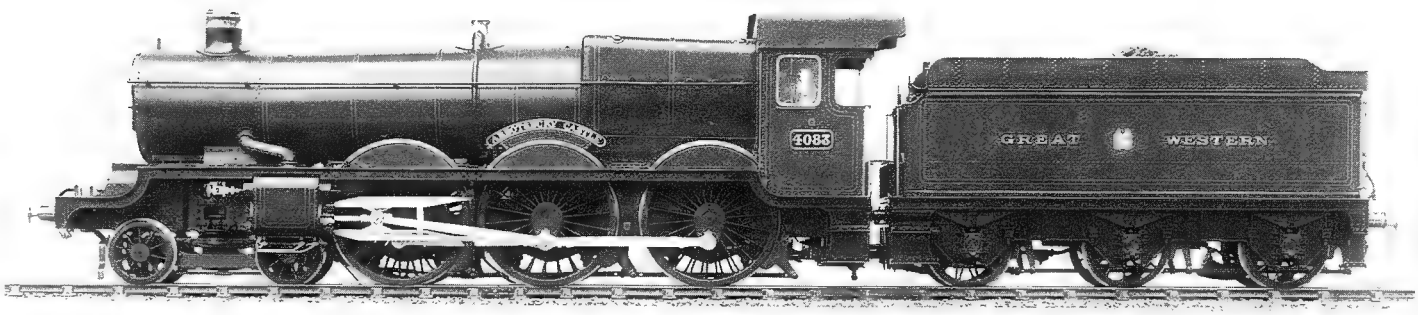


The cab interior of No. 5026, showing the oil gauge in the position normally occupied by the sight feed lubricator, This picture shows all the other bits and pieces like the bucket and oil feeder standing in the corner, essentials such as the tea can on the shelf and the fireman's lunch in the gas-mask bag hanging on the hook with his jacket.

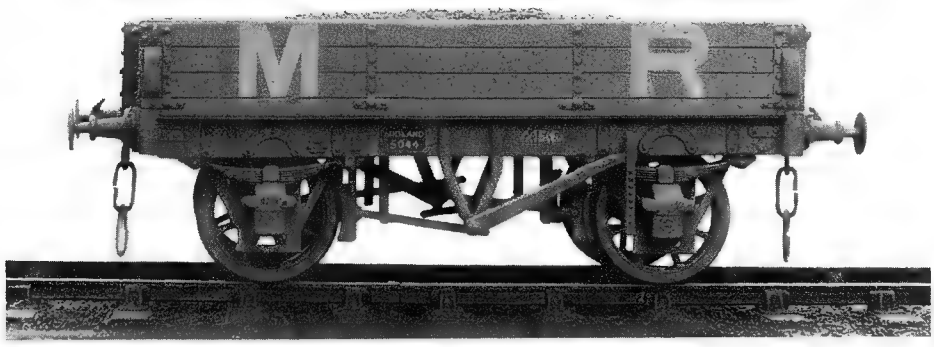
The result can be seen on the model. I've never seen much written down about the GW system of mechanical lubrication but I've come to the following conclusions from the study of photographs. Originally, the lubricator box was placed to the rear of and inboard of the steam pipe, but later moved in front of the steam pipe because access to the motion had been restricted. One thing that puzzles me is where the motion was derived from to drive the lubricator. There is a ratchet and wheel on the rear with a link to be fixed to the motion somewhere, but in the original position of the box there is no valve gear movement that I can see in the immediate area. Can anyone enlighten me please so that I can make the next one work?

By 1955 the cowl previously covering the oil pipes up on the side of the smokebox of *Criccieth Castle* was replaced by a longer pattern with straight sides now to accommodate an external steam pipe to the blower. There was also a patch on the boiler in front of the firebox for access to the blower and atomizing steam pipe unions. In the cab the five-sight feed lubricator (fitted from the 1930s onwards) was removed and an 'oil/no oil' gauge put in its place. My thanks to Carl Legg for producing the artwork and printing me up the faces of all the dials in the cab. He also produced the artwork for all the name and numberplates, chequer plate and cab warning signs and got them etched for me, and in so doing contributed to making these better models than they would have been otherwise.

To be concluded in the next issue.



Abbotsbury Castle, *showing how plain the 'Castles' could be when first built.*



LMS Wagon Miscellany

Since MARTIN GOODALL's last essay on 4mm wagon kit-bashing appeared in MRJ No. 45, a number of readers have asked for more. Well, he's finally done it, this time tackling the LMS:

I am a firm believer in the saying that there are basically three types of untruth: lies, damned lies, and statistics. So I have always been somewhat sceptical of suggestions that one should build wagon stock strictly in proportion to the overall totals owned by the various main line companies. Averages are misleading. There was no such thing as an 'average' branch line; they were all different, and each one had local characteristics affecting the goods traffic it carried and hence the wagons to be seen on that line. Furthermore, photographic evidence seems to indicate that outside the central industrial core of the railway system (in the Midlands and North) the wagons of the home company tended to be more common than the statistics might suggest. This, at least, is my excuse for having built far too many Great Western wagons for the Burford Branch.

I would have to admit, though, that a layout which had no wagons other than those of the home company would be unrealistic, and so even the most blinkered devotee of God's Wonderful Railway must bring himself, sooner or later, to build some examples of goods vehicles from the other, minor lines such as the LMS, the LNER and the Southern. In this short series of articles, I shall be describing a dozen examples of LMS wagons which I have built from various kits.

As I embark on this narrative, I can already visualise the entire membership of the LMS Society sharpening their quill pens, ready to fire off missives to the Editor as soon as this upstart Goodall, who knows practically nothing of the 'Ell of a Mess and all its works, is seen to have put a rivet in the wrong place. In fact, I would be pleased if they would do so, as extra information of this sort is always welcome, and I am grateful to those readers who have added useful facts to supplement or correct the material in previous articles in this wagon-building series.

Having been accustomed to the well-ordered practices of the GWR, the apparently chaotic construction variations among LMS wagons came as something of a shock to me. In fact, my easy assumption of uniformity led me into a number of errors which required subsequent correction. I soon learned that it is advisable to model a vehicle of which you have a photo, in order to avoid the numerous pitfalls that await the unwary, in the form of different wheels, brake gear variations, minor changes of livery and numbering, and so on.

MR LOW-SIDED GOODS WAGON (D305)

Four of the LMS wagons I originally built were, in fact, Midland Railway vehicles, but I have always regarded the LMS simply as the Midland writ large, and the similarity of their liveries made it convenient to build them all in the same lot.

The excellent Slater's kits form the basis of the four MR vehicles, the first of which is the well-known three-plank open (Slater's catalogue No. 4029), probably the Midland Railway's most common wagon type. I had always understood that two-plank and three-plank opens were referred to as 'medium' goods wagons, and that the term 'low' or 'low-sided' was reserved for one-plank opens; but the Midland called these three-plank vehicles 'low-sided', which seems to put the matter beyond argument.

This wagon, together with the five-plank open and the 8-ton van described below, are very typical of my approach to wagon building, and to modelmaking in general. If you were so minded, you could go to great lengths to add missing details, correct minor inaccuracies, and generally titivate your models to the nth degree. That is not my idea of fun; my aim is to build models that reproduce the general appearance of the original, sufficient to capture the essential character of the prototype, without slavish attention to detail, especially detail which is unlikely to be noticed when the wagon is running on the layout. 'If in doubt, leave it out' is a fair summary of my philosophy.

When approaching the assembly of a kit, therefore, I am usually prepared to go along with the manufacturer's design, only modifying or adding to it where this would make a significant difference to the appearance of the finished model. In the case of this three-plank open, I made only three departures from the kit as supplied. First, in order to make room for compensated suspension, the floor was turned upside-down and material was filed off the insides of the solebars; secondly, the buffers were replaced; and thirdly, door stops were added at each end of the two sides.

As readers may recall, I don't believe that the compensated suspension of carriages and wagons is really necessary, even in P4, but at the time I built these models, I was still evaluating the performance of the first five GWR wagons which I had built without compensation and, until I was satisfied with the results, I continued to compensate other stock, including all twelve of the wagons described in this series. The rocking W-iron unit on the Midland three-plank (a Studiolith stamping, as before) is pivoted on a thin strip of Plastikard, and secured by track rivets melted into the plastic with a soldering iron.

It is the buffers which are usually the one factor which let plastic kits down, but this is not so with the Slater's kits. Their moulded buffers are perfectly satis-

factory in appearance; the only snag is that the turned heads are slightly on the small side, which can give rise to buffer locking problems. Partly for this reason, and partly because I wanted to take this opportunity to experiment, I fitted sprung buffers to these four wagons. Suitable turned buffers used to be available from MGW, and I am not sure if they are still available from another supplier. The moulded buffer housings on the headstocks were filed down, leaving the base or flange intact, and a slight rebate was drilled in the outer face to take the end of the buffer housing; a smaller hole was drilled through the headstock to take the tail of the buffer. The buffers and springs were fitted later, after painting.

The wooden door stops were a small detail which it seemed worthwhile to add. They were carved from Plastikard and stuck on with Mek-pak. On re-examining the model while writing this account, I spotted one other missing detail which I should perhaps have dealt with. This is the absence of a rod connecting the outer and inner V-hangers and the brake push-rods. The omission is obvious when the wagon is closely examined but can hardly be seen when the wagon is on the layout. Now that I am aware of it, this is a detail which I shall probably tackle in future models of the same type, but retro-fitting of this sort of feature is rather tedious, so I shall probably leave the fault uncorrected on the existing models. Incidentally, I put brake gear on both sides of the wagon, as it was supplied in the kit, but in many cases the extra brake gear is unlikely to have been added until well into LMS days, if at all.

The vast majority of MR wagons seem to have had ordinary eight-spoke wheels, with comparatively few having wheels with split spokes. The LMS seems to have made far greater use of the latter kind of wheel. All four of my Midland wagons have been fitted with Ultrascale eight-spoke wheels. Couplings are the Smith's Fittings three-link type (LP1) now supplied by W & T. They are slightly over-scale, but easily manipulated with my home-made shunter's pole.

As for livery and choice of number, this wagon was painted in a batch with the other Midland and LMS wagons, and so it was finished in the light grey livery. I suspect that in its final Midland form it would be more likely to be seen painted in 'smudge' (dark grey). The number, 5044, which is carried only on the number plate on the solebar, was chosen almost at random from the number plates on the Slater's transfer sheet. Although it was a number borne by a D305 wagon,

the prototype differed in several of its details from my model and came from an early lot which is unlikely to have survived more than a couple of years after the First World War. However, the number is definitely not legible on the layout (nobody's eyesight is that good!), especially now that the wagon has been well weathered; so I remain unrepentant.

The load is crushed limestone aggregate, and I wonder whether this should really be carried in a drop-side wagon, but no doubt such things did occur. It gave me the excuse to weather the wagon with a heavy coat of stone-coloured dust acquired while the wagon was being loaded at the quarry. Weight was added both inside the load and under the floor.

MR HIGH-SIDED GOODS WAGON (D299)

The specification for this five-plank open (Slater's catalogue No. 4027) was precisely the same as for the three-plank version described above. In this case, there were no additions to the bodywork, so the modifications were confined to the adaptation for compensated suspension and the substitution of sprung buffers. All other constructional details were identical to the previous model.

I deliberately selected a four-digit number, 3783, in order to cut down the work in lettering the wagon. In this case, there was no corresponding number plate on the transfer sheet, so the number plate on the solebar was simply painted dirty black, and under a coat of weathering the absence of a number is hardly noticeable. My remarks on the livery and brake gear of the three-plank open apply equally to this model.

I chose in this case to finish the model with a high sheeted load, and not having any Midland wagon sheets, I used an early LNER tarpaulin from the excellent PC Models sheet (WS3). It would be quite possible to see wagons in the years immediately following the Grouping in 1923 still in their pre-Grouping colours, but carrying post-Grouping wagon sheets. In this case, I was careful to use an early post-Grouping example. Wagon sheets were common user after 1923, so it is quite proper to put an LNER sheet on an LMS wagon, or vice-versa, or any other combination you care to dream up. As well as being held down by its own ties, the wagon sheet is also secured by two ropes passing diagonally over the top of the load. As with other wagons, I have added miscellaneous chalkings to the bodywork, many of which consist of illegible hieroglyphics understood only by shunters in marshalling yards.

MR 8-TON COVERED GOODS WAGON (D357)

The third in this quartet of Midland wagons (Slater's catalogue No. 4030) shares the same design of underframe as the two previous examples. Quite apart from considerations of batch-painting groups of wagons in the same livery, it makes sense to build similar wagons together, as constructional methods can be readily copied from one model to the next, and so construction is speeded up.

This model differs very slightly from the two preceding models, by having its rocking W-iron unit mounted on a piece of rubber band (my usual method) rather than its being secured to a Plastikard 'fulcrum' by soldered track rivets. In every other respect, the van conforms

with the construction of its fellows. In fact, on reflection, I believe that the 8-ton van originally had the rocking W-iron unit riveted, but this was changed as a result of damage sustained in an accident (I dropped it). The brake gear had to be rebuilt at the same time.

Another four-digit number was chosen: 5095. I see that I applied the wrong tare weight to the solebar (5.8.2 instead of 5.9), but this is yet another example of a detail which is practically illegible when the wagon is on the layout.

I should perhaps explain why I finished these wagons in pre-Grouping livery rather than in LMS colours. My original intention was that the Burford Branch should be set in about 1934, but I have a liking for the pre-Grouping wagon liveries. So I have set the period of the fixed parts of the layout at around 1930, and have split the rolling stock into two groups, one representing the period just after the Grouping, and the other centred on the mid-thirties. In practice, my rolling stock construction seems to be covering more or less the whole period between the two world wars (with a few examples of wagons built as late as 1945), so a degree of modeller's licence has to be employed to justify some items of rolling stock being seen together. As the fleet grows, it should be possible to avoid the more obvious anachronisms, but for the time being I tend to run stock together indiscriminately.

MR LARGE CATTLE WAGON (D296)

The Midland had the annoying habit of building wagons of distinctly different designs to the same diagram, and so I am not absolutely sure that I have quoted the correct diagram number for this vehicle. I believe that the drawing number was 2242A. Perhaps it does not matter, as the Slater's kit (catalogue No. 4031) makes up into an excellent model of a Midland cattle wagon, whatever the diagram number may have been.

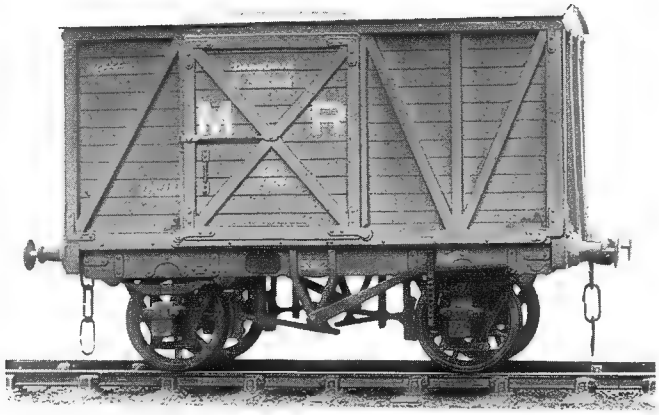
Apart from the obvious difference in length, and the increased wheelbase, the construction of this wagon was very similar to the other three Midland wagons. Wire was employed for the head bars in place of the plastic rod supplied; it is both more robust and more stable. The couplings are screw-type (Smith's Fittings LP5), which do seem to have been fitted by the MR to some of their cattle wagons; the practice became quite common after the Grouping, irrespective of whether or not the cattle wagons were vacuum-braked. The object was to give the cattle a smoother ride by reducing the surging effect which could set up in a loose-coupled train. One detail which I originally omitted to deal with, but which I have subsequently attended to, consisted of adding partition guides, cut from Plastikard.

The number of this wagon depends on the side you view it from! It was intended to be numbered 23014, and that is the number on the plates on both solebars, but, due to my having messed up one of the transfers, the painted number on one side of the wagon is 14437. It is just as well that the number plate is too small to be legible (except, no doubt, under the searching lens of the MRJ camera!).

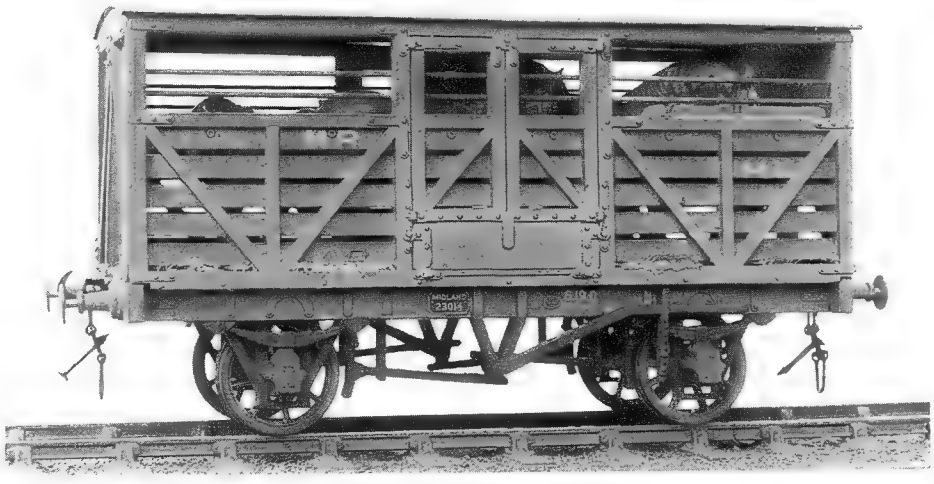
Just to be different, I decided to load this wagon, and one of the LMS cattle wagons to be described later, with horses rather than cows. These are heavy horses, the type that worked on farms, which would be carried in cattle wagons rather than horse boxes. The latter were reserved for the aristocrats of the equine world, such as race-horses and hunters. Straw bedding can be seen poking out through the gap between the floor and the bottom plank. This was represented by plumbers hemp.

One point where I went wrong was in failing to secure the horses' heads, so that in theory they are free to charge about inside the wagon, a situation which would never have been allowed in practice; the RSPCA and the Ministry of Agriculture would have thrown the book at the railway company for such a heinous offence, and the horses would be pretty mad, too, by the end of the journey. The point may in fact prove to be academic, as I believe that when horses were carried in cattle wagons it was the practice to cover the upper part of the wagon with a tarpaulin. I may add this detail in due course, in which case the failure to tie up the horses will no longer be visible.

To be continued



The results of some dedicated kit-bashing: the ex-Midland high-sided goods wagon (opposite) has been given a load, sheeted with an LNER tarpaulin. The Midland 8-ton covered goods wagon (right) is from the Slater's kit, and the large cattle wagon – another old favourite – is derived from the same source.



Misc.

STOLEN COACHES

Readers, traders and swapmeet browsers are asked to watch out for the appearance of items from a batch of 93 hand-built 4mm/OO coaches stolen from Taunton, Somerset, recently. Commissioned by a member of Taunton Model Railway Group who died earlier this year, they are easily identifiable to the knowledgeable eye, not least because they were all built by D. C. Lawrence and painted by Larry Goddard, both of whom put their marks on the underside; some even have a 'Lawrence Scale Models' plate. The models were mainly of Southern Railway prototypes, including Bulleid, Maunsell and Ironclads, but there was also some LNER articulated teak and tourist stock, three LBSC Billinton coaches and a dozen GWR pieces. If you suspect that you've come across any of these, please contact the Crimestoppers freephone number 0800 555111 and mention that Taunton police are dealing with the matter.

NEW STREET IN THE MEN'S ROOM

Late in May, Channel 4 ran a short episode in its *Men's Rooms* series called 'Model Men', looking at the motivations of adult railway modellers. It featured a meeting at a London model railway club and the work of a man who is re-creating the whole of Birmingham New Street in 4mm scale and pushing toward his ambition of one day running a complete 24-hour BR timetable. The programme had the potential to damage the hobby and indeed, some of the slightly outdated views of the clubmen may have caused a dent or two, but the programme was surprisingly saved by the New Street model, which could quite easily have come across as just another bit of loony empire building. Instead, we saw a team of slick and dedicated operators, some quite young, controlling what was clearly a highly complex organism with terrific professionalism, plus some tracking shots of the railway in action which must rank as some of the best model railway film yet seen. Not a great victory, perhaps, but definitely a step in the right direction.

RAY'S A LAUGH

The postal response to Jack Ray's article 'It's All in the Mind' in MRJ No. 72 proved just how well-loved and respected his 'Crewchester' layout is. Anyone wishing to hear more may care to know that the great man himself is giving an illustrated talk on the layout at Manchester Model Railway Society's HQ – Dean Hall, Mersey Road, Sale, Cheshire – on Saturday, 12th November at 2.30 p.m. Admission is free and all are welcome. You can take it from us that Jack is a thoroughly entertaining and accomplished speaker.

HELP WANTED

E. J. Purcell of 187 Selly Oak Road, Kings Norton, Birmingham, B30 1HR is researching the Harborne Railway and whilst he has some plans which have appeared over the years in the model press (and the 1950 *Railway Magazine* article) he would appreciate any assistance in the form of documents, drawings, photographs and personal reminiscences. Costs will be reimbursed.

Doug Ware of 59 Vicarage Road, Leyton, London E10 5EF is building a 7mm model of an LSWR H12 railmotor and seeks photos, details or even pointers in the right direction for information about the interior of the 'cab' end away from the boiler unit. Postage will be reimbursed.

R. J. Lobb, Box 410, Sydenham, Ontario, K0H 2T0, Canada, Tel. 613-376-3766. Fax 613-376-3102, is seeking information, photos, etc. on the old West Cornwall/ Great Western Railway terminus at Newham Wharf (Truro), especially in the '20s and '30s. All responses replied to and reasonable costs covered.

SOCIETY NOTES

Cavan Toohey of 25 West Hill Drive, Mansfield, Nottinghamshire, NG18 1PL, has been appointed secretary of the **Historical Model Railway Society**. He extends a welcome to all readers to attend any of the HMRS meetings which regularly take place up and down the country.

We've had requests for information on a couple of established specialist societies lately, so here are reminders on how to contact them. First the **Colonel Stephens Society**, for everyone interested in the light railways built and operated by that incomparable entrepreneur Col. Holman F. Stephens – membership secretary Nigel Bird, Bryn Hir, Llwyn-y-Groes, Tregaron, Dyfed, SY25 6PY. Also the **Broad Gauge Society**, for fans of Brunel's great wide road to the west – membership, Alan Garner, 18 Pilgrims Way, Canterbury, Kent, CT1 1XU. All enquiries to both societies must include a large SAE.

Bedford & District MRS is looking for new local members who would be interested in working on the current club project – a model of Buckingham LNWR in 4mm/EM. You might even get roped in to operate the club's wellknown 7mm NG layout 'Glen Aros'. Anyone interested can contact John Payne, the Chairman, at 18 Amberley Gardens, Bedford, MK40 3BT (0234 262301).

The EM Gauge Society's long-serving membership secretary Ted Butler has for reasons of poor health found it necessary to hand over this vital responsibility, although he happily remains on the board of the Society. In recognition of all his efforts on behalf of the EMGS, the board has unanimously voted Ted an honorary life member and vice-president. Chairman Mike Bell is now looking after membership matters at 200A Prospect Road, Woodford Green, Essex, IG8 7NG.

The World War II Railway Study Group has a new secretary: Greg Martin, 17 Balmoral Crescent, West Molesey, Surrey, KT8 1QA. The group has also widened its aims to cover the use made of railways by the opposing forces as well as British and allied nations.

Weston Railway Modellers have moved to spacious new headquarters in Weston-super-Mare – providing the novelty of an almost flat floor on which to set up the much-admired 'Grove Park' layout. Consideration is currently being given to the construction of a replacement and there is room for new members. Anyone interested should contact secretary David Barrett on 0934 513526.

Leamington & Warwick Model Railway Society has a new secretary: Steve Ridgway, Highcroft, St. Michaels Close, Ufton, Warwickshire, CV33 9PA (0926 613529). The club has several layouts, including 'Walford Town' (see MRJ No. 70), and meets weekly in Leamington Spa. All are welcome and should contact Steve in the first instance.

The new secretary of **Southport Model Railway Society** is Peter Mills, 5 Fordlea Road, West Derby, Liverpool, L12 5EX.

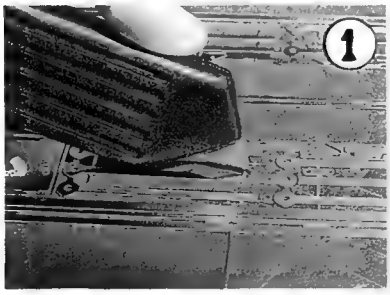
Taunton Model Railway Group, builders of the excellent layouts 'Tamerig', 'Bishport' and 'Wilkshead' – and lucky enough to have clubrooms at Bishops Lydeard station on the West Somerset Railway – is seeking a few new members to continue its work. Would-be recruits need to be dedicated finescale OO modellers or keen operators or both. In the first instance, contact secretary Tony Bagwell on 0823 253186 or 0278 654316.

Uckfield Model Railway Club has a new secretary: Keith Harcourt of 53 Bridger Way, Crowborough, East Sussex, TN6 2XD. Club HQ is a 19th century barn in Uckfield, where members working in the smaller scales have completed a finescale 'O' gauge layout and have a new OO and EM combined layout; a P4 layout is a distinct possibility. Anyone interested in visiting or joining should contact Keith at the above address.

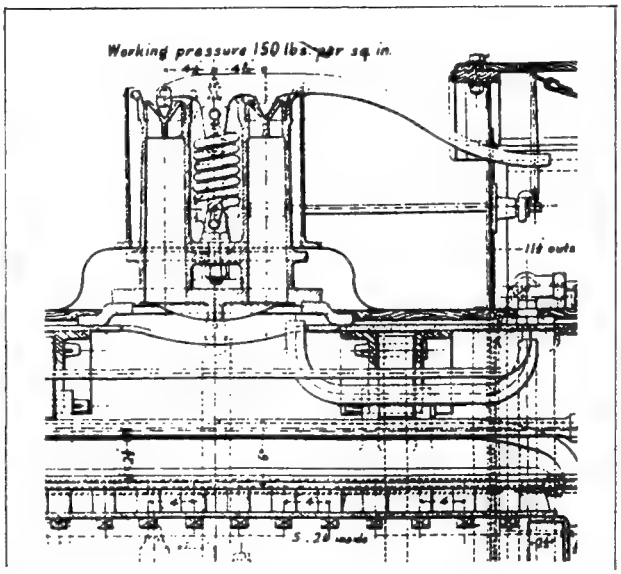
Congratulations to the **009 Society**, whose membership has just broken the 1,000 barrier and now stands at 1,044. Anyone interested in increasing that figure can contact Peter Bayly, the membership secretary, at 3 Bottrill Street, Nuneaton, Warwickshire, CV11 5JA.

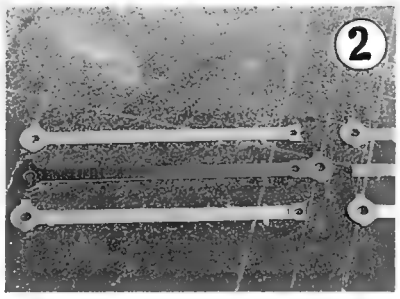
The old Portsmouth and South Hants Railway Circle has had something of a renaissance and has changed its name to **The South Hants Model Railway Club** and moved its meeting to Fort Widley, Portsdown Hill Road, Portsmouth, Hants, taking the 'Meon' and 'Midsomer Norton' layouts along. Meeting nights are Tuesdays at 8.00 pm for 4mm (EM and P4) and the same time on Thursdays for the newly-formed 7mm group. The secretary is Dennis F. Prince, The Coach House, Prinsted, Emsworth, Hants. PO10 8HR.

Having been modelling for around 45 years, the 19th Earl of Clew tells us he has recently decided to revert back to the methods and materials he used as a teenager, building much of his proposed new 7mm narrow gauge layout from card and wood – "mostly grocery boxes and various cardboard cartons, which was just about all that was available at the end of World War II." The photo shows one of the buildings for Lord Clew's 'Swanley & Mayford Railway', which is under way in a railway room 28ft by 12ft. Just as some people collect and run only tinplate model railways, maybe scratchbuilding by distinctly low-tech means is one of those special-interest strands that could be rewarding. Who remembers Seccotine, flour-and-water paste, plaster of Paris, insulating tape and soldering irons on the gas ring? And who could manage without modern plastics, etched brass, superglue and paint in tinlets?



Using a trimming knife and a modeller's cutting mat (of the sort made by Olfa), the rods are separated from the etch. Hold the knife at a very low angle and just press firmly down with the blade.



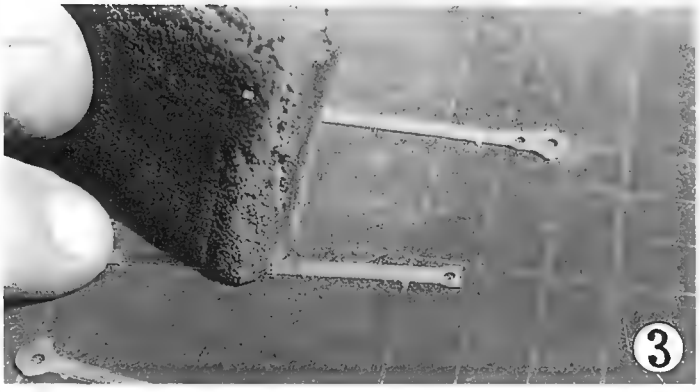


Three etched layers make up the coupling rod, which is jointed on the crankpin of the centre wheels. Notice that the etch tabs were not cut too close to the rods. The tabs are filed away after soldering.

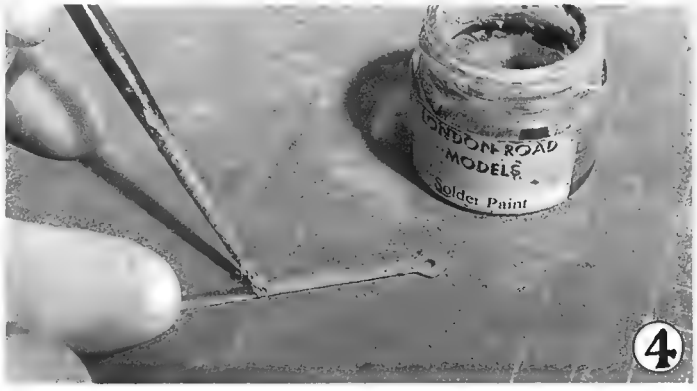
WORKSHOP MATTERS

Assembling etched coupling rods

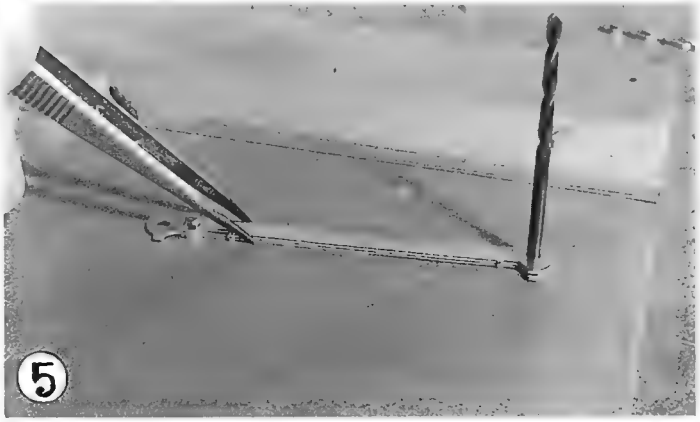
Like wheel quartering, assembling etched coupling rods is one of those jobs which tends to be approached with trepidation. It's not so much that they're difficult, but that the sweet running of the entire locomotive ultimately depends on their accuracy. LAURIE GRIFFIN, a professional modelmaker, recently started a kit of a 7mm scale LMS Jinty and took the opportunity to show how the coupling rods should be fabricated:



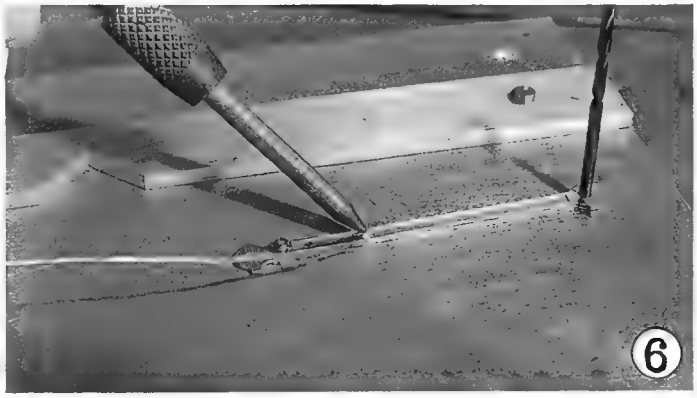
To help solder flow freely, it is important that the metal is clean. Marks and tarnishing on the metal are removed by rubbing with a Garriflex abrasive rubber (medium grade), available from tool suppliers and specialist model shops.



Solder paint (188°C) is used, sparingly applied to one side of each part of the joint with a small paintbrush.

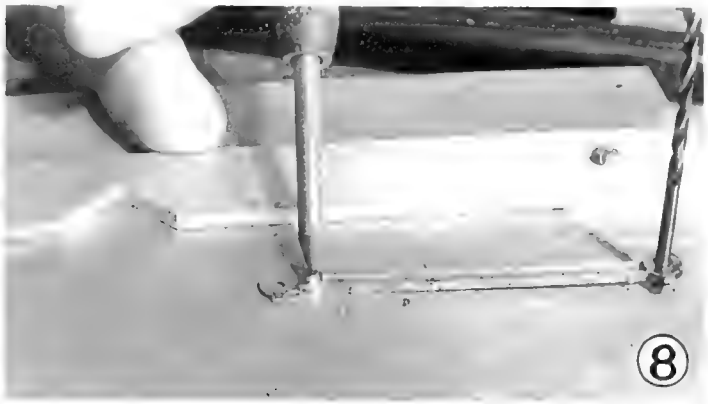


The sandwich of rods and solder is held in line with a 2.5mm dia drill (which matches a Slater's crankpin); the molten solder will not stick to a blackened drill, so don't worry. The drill fits into a hole already drilled into the aluminium plate used as a base and as the negative connection for my resistance soldering unit, although an ordinary iron will work just as well. The tweezers are useful to align the various pieces in the assembly widthways.

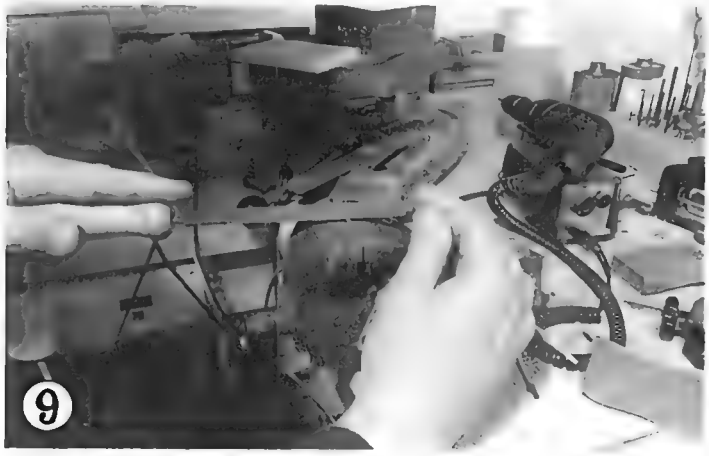


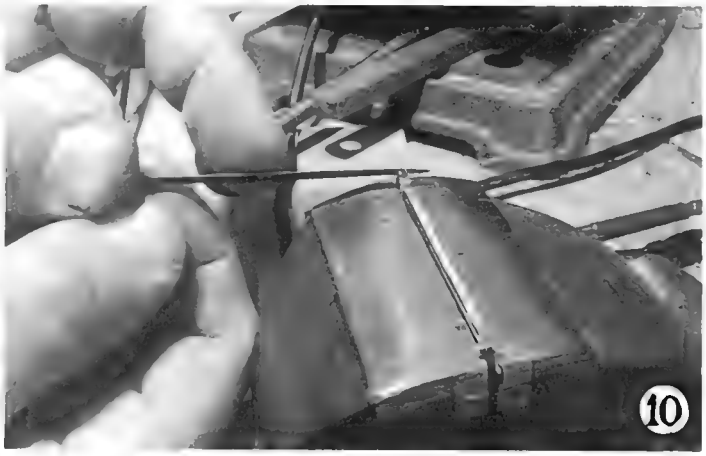
The probe of the resistance soldering unit (mine is Exactoscale with a home-made electrode holder) is pressed onto the end of the coupling rod, the switch pressed until the solder melts and then released. The probe (or iron) will maintain pressure on the pieces, keeping them securely in place while they are being soldered. Then move along about 1 cm and repeat the process. If resistance soldering, don't move the probe with the current on as this can cause arcing which may mark the surface badly. On this job, feed a little more solder into the joint; here some Multicore 60/40 tin/lead 22swg cored solder is being used (this is more controllable than the thicker gauges).

Photos: BARRY NORMAN

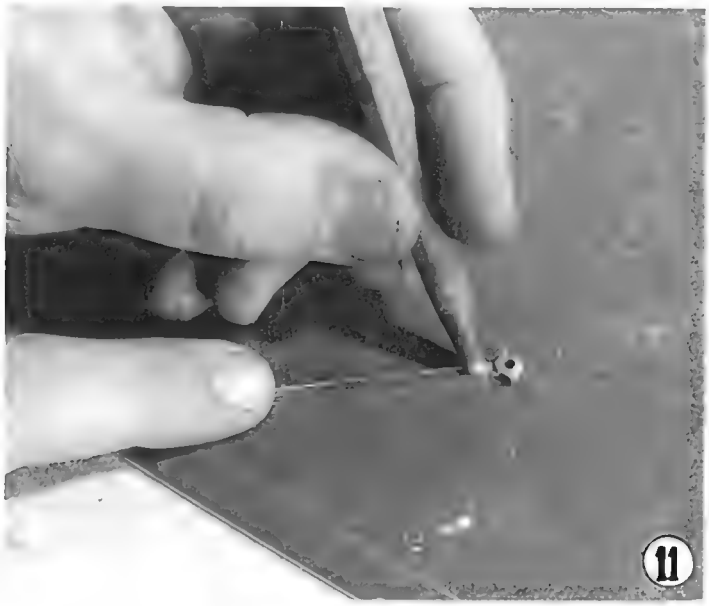


Solder paste has been wiped onto the other pieces and they are soldered quickly into place (it should take about 1 second to solder the joint). A Slater's 7mm scale track rivet represents the knuckle pin on the coupling rod.





The coupling rod assembly is now held in a vice (mine is a Record No. 0) which has had its jaws replaced or covered with soft mild steel strip – important, as the original jaws have a deeply serrated face which would ruin any fine work held in it. A 6in smooth cut handfile is used to clean up the flat edges and a half-round needle file is used to finish around the awkward bosses on the ends of the rods.

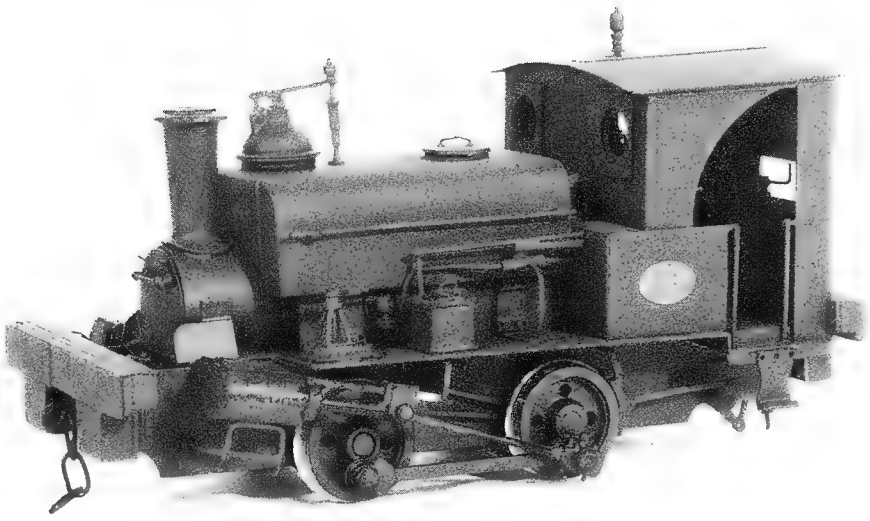


A useful tool to finally clean any marks or stray solder from the face of the rods is a glass fibre pencil which can be rubbed quite forcefully along the metal. Be wary of the fine splinters of glass fibre that are worn away – they can stick in your fingers with painful results and must be kept away from gearboxes and motors (and never blow them off your work or benchtop in case they get into your eyes. I use a brass suede brush to sweep them and all the other dust into a bin).

As you can see, a fairly simple task – and an ideal early exercise for anyone learning the skills of soldering with a resistance soldering unit.

For a review of a new resistance soldering unit, see page 217. An article on resistance soldering techniques will appear in a future issue.

The Little Old Lewin



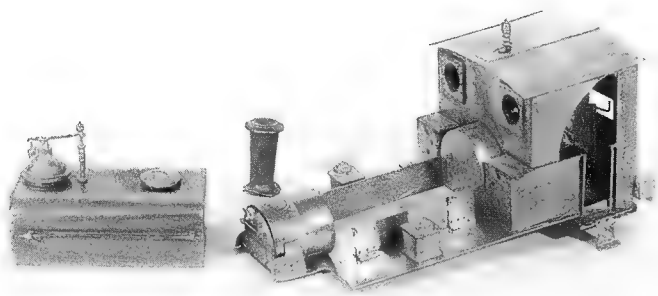
PAUL BERNTSEN's fascination for small industrials inevitably led him to the 4mm Impetus kit of the Lewin Foundry's Seaham Harbour 0—4—0, purportedly the longest-serving steam locomotive in Britain. He found it ideal for beginners:

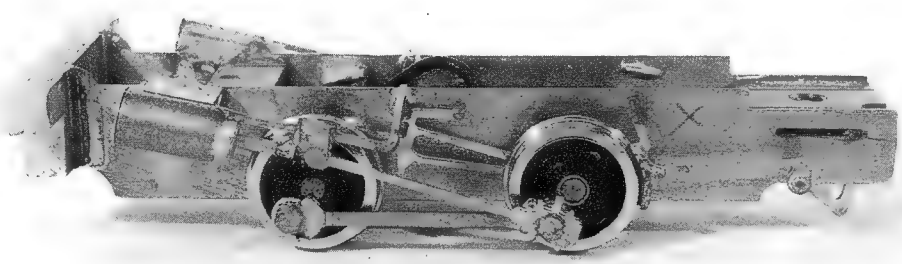
For some time now I have admired the locomotives advertised by Impetus. Robin Arkinstall is a man who appreciates what I call proper-sized locomotives – tiny industrials, ideally suited to etched construction with fine edges and delicate detail. I recently had the opportunity to assemble an Impetus 4mm Lewin kit and I was not disappointed. Although I knew I'd want to change some aspects of the kit's design – as I usually do – back numbers of MRJ convinced me that this is the sort of review expected by thinking modellers. Besides, it is very important in my mind to take the attitude that kits, no matter how good, are actually sets of pre-made parts to aid model making, not sets of rules to follow slavishly.

No. 18 of the Seaham Harbour Company, built by Stephen Lewin in 1863, is the prototype of this kit. She was originally a well tank, as a result of which the valve gear is arranged between the wheels and the frames, on the outside. The locomotive was rebuilt with a saddle tank (a Black Hawthorn tank) in 1923. Incredibly, this industrial veteran was still running in the mid '60s, apparently making it the longest-lived, continuously working steam locomotive on record.

The Impetus kit is designed to represent the locomotive in its 1960s condition. The kit comes with an etched chassis, footplate and cab, with the saddle tank, smokebox, firebox and buffer beams as whitemetal castings. Lost wax brass castings provide the fine detail, including cab fittings. Sharman wheels of correct pattern are provided, together with 3/32in axles (see footnote). The motor and gearbox are not supplied; recommended motor is a Mashima 9x16. The kit chassis is not designed to be equalised and the builder is left strictly to his own devices in regard to pick-ups, two omissions which represent my only criticisms.

I decided to equalise my chassis to maximise power pick-up and for the same reason fitted split axles. I selected a Mashima 9x16 motor as the driving force and Exactoscale's very nice 40:1 gears. To discover how I went about all this, you need look no further than the chassis section of my recent MRJ Manning Wardle project series. For equalisation, I elongated the axle holes in the frame (for the non-driven axle, obviously) and used exactly the same simple method of retaining the moving axle bushes as with the MW. In fact, I used the same bushes, the same Branchlines split axles and the same method of making Sharman wheels fit them – by pushing bushes into the backs. This, of course, meant that the distance between the frames had to be reduced to accommodate the increased space required by the bush 'brims' running face-to-face. To do this, I simply discarded the frame spacers provided in the kit and made narrower ones from printed circuit board material – one running nearly the full length of the cab, one at the front and one set to hold the motor mount, once again as per the MW. This is no criticism of the kit – for split axles, I'd have had to make new insulated spacers in any





event. Indeed, the mark of a good kit is that it can be adapted to suit individual requirements. Finally, I made my fixing holes in exactly the same places as the kit spacers, so the body could be built in accordance with the instructions.

I also diverged from the instructions in the matter of the motor mount. Instead of the axle-hung mount suggested, I used the simple bent strip mount screwed to the central spacer, as on the Manning Wardle. This is a matter of personal preference, although I do contend that setting up a drivetrain doesn't come much simpler than this.

The etched footplate folds up in an ingenious manner to locate the saddle tank and also to represent the drop in the footplate under the cab. The cab and bunkers also fold up neatly and fit together well. Manufacturing the smokebox, saddle tank and firebox from whitemetal makes the locomotive a nice weight and once again assembly is very simple. I cleaned up the saddle tank on a full sheet of fine emery paper and was surprised at how good it looked for very little work.

Once the brass detail castings are fitted, the builder is left with a little wire bending and fabrication to represent the piping and plumbing. Careful work here will be well rewarded.

To fit conventional pick-ups I would fit a brass spacer across the frames between the wheels and screw a piece of PC board to this. I'd fit fine phosphor bronze wire for pick-ups, soldering on two straight pieces and then bending them to bear lightly on the backs of the wheels.

In conclusion, the things I didn't like about this kit were the lack of provision for equalisation and pick-ups, and perhaps the rather terse instructions. Things I did like were the precise etchings with clever fold-ups, the innovative use of whitemetal giving plenty of weight, the correct pattern wheels supplied and the fact that the model has captured the character of the prototype – it's every inch the little flat-capped workhorse its long-lived prototype undoubtedly was.

The simplicity of the subject and the skilful use of available manufacturing technology make this a very easy build, absolutely ideal for the beginner (which is something that can be said for many Impetus kits). I hope to see more interesting industrials emerging from deepest Coggeshall!

The 4mm Lewin costs £45.25 including post from Impetus at PO Box 1472, Coggeshall, Colchester, Essex, CO6 1UQ. Wheels are no longer supplied, due to customers wishing to source their own. The review model uses Sharman 2ft 6in disc drivers.

A 7mm version of this loco is now available, price £78.50 including post (requires motor, gears and wheels).

Men's Individual Freestyle?

Jack Ray's piece in MRJ No. 72 was an interesting read. One suggestion would be that we start judging models in the same way as ice skaters. Thus a spotless P4 wheelset could be given 6.0 for technical merit and 0.6 for artistic interpretation. An even better idea is to stop judging models (and modellers) altogether! In the final analysis, a model can only really be given one simple test: does it satisfy the owner? If it does, it has succeeded; if not, it has failed.

Warwick Law
Swindon
Wilts

I was so much in agreement with Jack Ray's philosophy on model railways that there seemed to be nothing to add. However, a few days after receiving MRJ, an event took place which added yet another facet to my appreciation of model railways. For the third year running I had the pleasure of handing over the outdoor section of my O scale railway to Clarry and Tony Edwards and Rafe Shirley for a day of finescale live steam. They filled two long sidings with a collection of superb locomotives, as many and as good (or better) as can be seen at many exhibitions – real engines, with water in their boilers and working valve gear and cylinders, unlike my own which have electric motors where the fire should be. To walk along those sidings, even before steam was raised, was an experience Jack Ray would have relished – even the smell was there. Two more sidings were used for steaming until they were off romping around Wingham's steeply graded main line with seven or eight Lima coaches. "Not very realistic" the timetable buffs, the electronic wizards or the scenic artists might say; "Playing trains", the purists may say. But on a hot July afternoon we, and a garden full of visitors, remained captivated by the sights, sounds and smells that only real steam engines can create. "It's all in the mind" says Jack, and quite rightly. Clarry and Co. introduce yet another dimension to this wonderful hobby.

Normally, of course, Wingham operates its two-rail finescale trains to a non-timed schedule with reasonable observation of the Rule Book. Jack himself has been a welcome visitor over many years (I am only two years his junior), and I hope he will forgive me for revealing a little secret. We have but one section with 'natural' scenery, unlike Crewchester's bucolic charms, and the main line is mostly on a plain baseboard. Jack's favourite trick is to bend with his nose dangerously near the edge of the baseboard and walk along beside a train with his eyes almost in the cab! "It's like being on the footplate" he says! I really must make a little trolley for that nasal organ before he comes again!

Deryck Featherstone
North Walsham
Norfolk

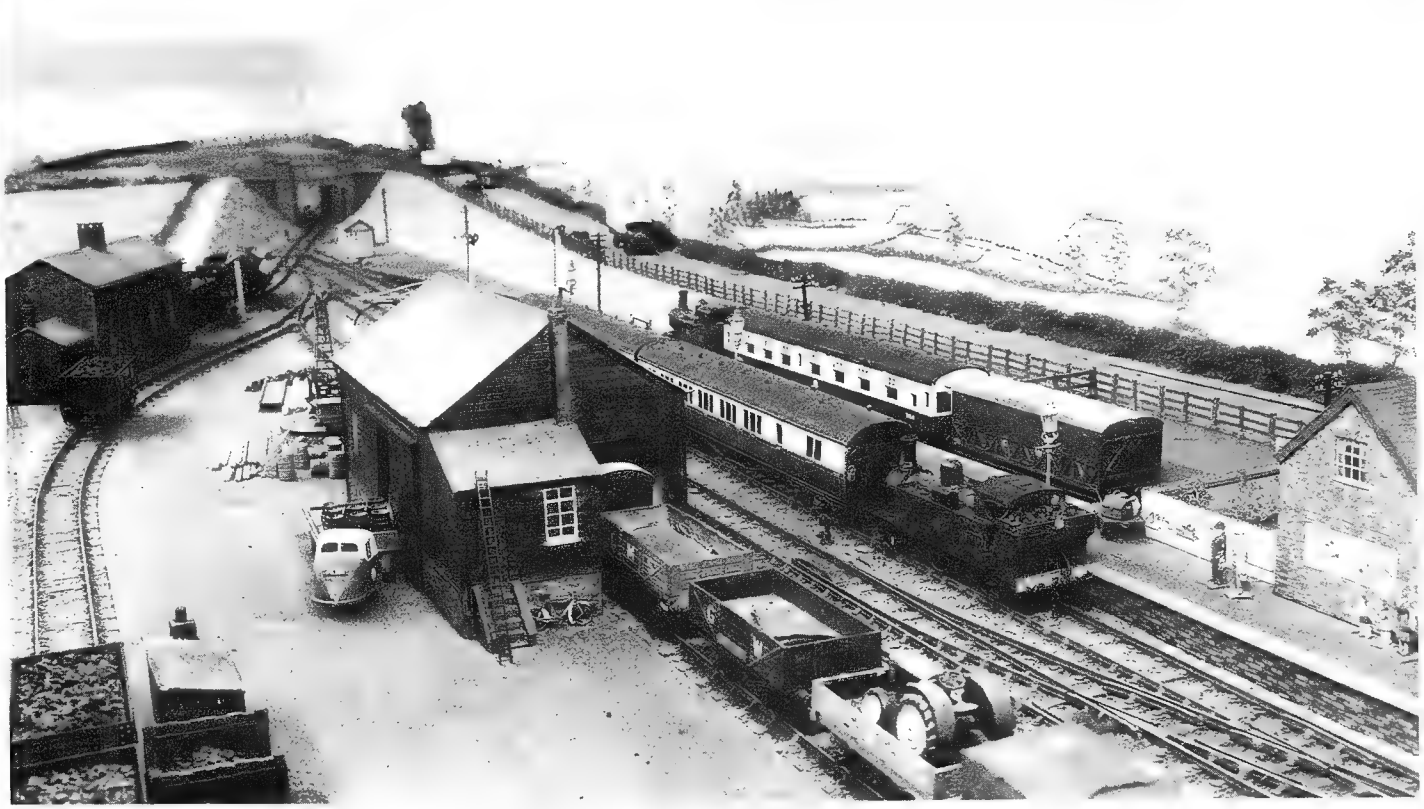
I should like to develop the theme of Jack Ray's article in MRJ No. 72, taking as my texts (as it were) Jack's 'Crewchester' and John Watson's 'Kenton' illustrated in the same issue. I have not actually visited either model, but I have spent many hours studying videos of 'Crewchester', and your superb photographs tell me a great deal about 'Kenton', so that I can say confidently that both models transport me instantly and totally to the railway scene of my youth before World War II. But 'Crewchester' is coarse scale; the supporting walls of platforms are visibly wooden battens; the platform surfaces are strips of roofing felt. How can this be as powerful as the perfectly realised details of 'Kenton'?

I suggest that there are two parts to the answer – one a rule for success, one a mental process. The first is the fact that the fundamentals of both models are absolutely right. The essential elements of the scene are all there, in proportion, in the right places, and there is nothing there which does not belong. This is the essential genius of all the finest practitioners of our craft – accurate observation and selection, and the rejection of all that is not appropriate. The second factor lies, as Jack says, 'in the mind'. There is a mental mechanism well-known to the police and accident investigators which enables us to fill in the missing parts of what we see with what we know should be there. I cannot recall, without reference to photographs, whether Jack's 'Royal Scot' has brake gear, but because 'Crewchester' follows the first principle set out above, my mind fills in the missing detail. Thus, when that locomotive sweeps through a station, hauling a rake of period LMS stock, and preceded by the rising excitement generated by the correctly located signal coming off, the illusion is complete and perfect – but because that first requirement has been met.

Now, Jack raises the question of those who have grown up since the demise of the steam railway. Such young people will not be able to create quite the same complete mental picture as I do from 'Crewchester'; nevertheless, there will be nothing to mislead them, and the lesson of the steam railway operated will be plainly there to be learned. John Watson's model is able to make explicit the detail of both railway and environment to such a person. It could not do so, however skilful the modelmaking, however fine the detail, unless it, too, complied with the rule of essential rightness. If my young grandson continues to have an interest in historical railways, I should want him to see and learn from both, for both are masterpieces in their way.

MRJ has for ten years now delighted us with the finest contemporary examples of the model railway craft, and has its own special place in the field of railway publications; long may it continue so. Not all of us are capable of the highest standards of construction, but all of us can follow the rule of observation, knowledge and appropriateness I have suggested. If we do, each of us can produce his or her own worthy masterpiece, and that I believe to be your central message and purpose.

Alan Swaisland
Little Brickhill
Bucks



Vernon Wood's HO model of Burford.

HOld Codgers

Despite finding the opening paragraphs of the article 'Layout Planning' in MRJ No. 71 – with the reference to a mythical Burford branch line – of much interest, I would like to put on record that Martin Goodall's idea of using this particular part of the Oxfordshire countryside for a fictional GWR layout goes back much further than 1975. Several decades, in fact . . . for another Burford in model form existed long before that date!

I refer, of course, to the layout built by Vernon Wood and which was conceived some 60 years ago, although – and due to the upsets of WW2 – it was not finished in the main until some time afterwards. But I would stress that this figure of 60 years is no exaggeration because some of the rolling stock had been built during the halcyon days of the 1930s – an example being an exquisite model of a two-coach 'B' set made by the famous Michael Longridge. The coaches are still in use.

Some years ago I took a series of photographs of Vernon's original Burford in the state it is operating in today.

Vernon, who like myself, is now well into his eighties, started with HO scale – as pioneered by Stewart Reidpath, A. R. Walkely and others in those far-off days – and sees no reason to change now. After all, and despite the insularity of the British modelling fraternity, we have been proven to be correct since 1:87 has become the international standard. I enclose a photograph to show what old codgers like us were doing in days gone by (probably even before you were born!).

Malcolm Carlsson
St. Austell
Cornwall

Mathematical stuff

May I add a few comments to the article 'Layout Planning' by Martin Goodall in MRJ No. 71? I feel it necessary to point out that if a curve is laid out, as he suggests, using a versine value of half the apex height, then the resultant curve is a parabola, not a circle. Whilst this may not be a bad thing (in fact a parabola is a good transitional curve), the minimum radius at the centre of the curve can be considerably less than that planned. This error increases as that total angle of turn increases. For example, for an angle of turn of 90°, the radius at the centre of the parabola would be some 30% less than that of a true circle. For this angle the versine value is 0.4142 rather than 0.5. The errors resulting from the use of small angles of turn 20° or less can be ignored.

C. A. Kimber
Lytham St. Annes
Lancashire

Looks familiar . . .

In the past few seasons of attending model railway exhibitions (mainly south of Watford), I have started to experience the increasingly common malady of 'exhibition *déjà vu*'. This manifests itself by the appearance of the same layouts in front of the eyes, a malaise which is rapidly becoming an epidemic among keen modellers. The cure seems to be the avoidance of model railway exhibitions by the sufferer, or – a more radical alternative – the forced treatment of recalcitrant exhibition managers.

Having got that out of the way, I am aware of the problems involved with mounting exhibitions. I can only sympathise with the demand that exhibits are up to standard and therefore must have appeared elsewhere before being shown, but surely this creates a chicken and egg situation? Also, many layouts are on display for no other reason than they are owned by a member of the society organising the exhibition. I know it's all down to balancing the books, but I would like to see more for my ticket money than a succession of pastetable sized layouts that seem to flood the provincial shows (no matter how good they may be – sorry boys), otherwise I ain't going to any more shows. A recent conversation at one Home Counties show may encapsulate the current thinking of many exhibition managers: I was told (in all seriousness) that all exhibitors should pay their own expenses, especially those with 'inconveniently' large layouts. His reasoning was that if you can afford to build something that requires the services of a Ford Transit, you can afford to pay for the movement of the said beast. His own city-based group had bought their own van for this purpose. This is an option I can neither afford nor wish to consider. My precious modelling budget is allocated to my layout and not the relief of the exhibition manager's outlay. So, before anyone leaps to the barricades to defend harassed exhibition management, I am trying to plead for some imagination, even given that every show must have one GWR branchline complemented by the twin sisters of BR modern and Thomas the Tank. The only alternative seems to be the specialist societies who, by virtue of their role, can only usually display the very best in a particular scale (bless their cotton socks). Please prove me wrong.

Tim Hale
Bournemouth

ROBERT ORMISTON-CHANT

We were deeply sorry to learn of the death of Robert Ormiston-Chant, one of the hobby's most vocal characters.

Known as 'Robbo' to his friends, thousands more recognised him by his formal signature – R. C. Ormiston-Chant – which appeared at the end of his many letters to the model railway press over more than 30 years. These were variously inspired, helpful, amusing, pompous, infuriating or downright rude. He was a famous nit-picker who enjoyed stirring things but was also perfectly happy to send himself up. A stalwart of Manchester MRS, Robbo was a skilled modeller known for his generosity of spirit. Although undoubtedly a little eccentric, he will be sadly missed for all the right reasons.

DIARY

SEPTEMBER

10/11 **Weymouth Model Railway Association** 6th Annual Exhibition at Weymouth College, Cranford Avenue, Weymouth, Dorset. 10.30 – 5.00 (4.30 Sun). £2.00/£1.00/£5.00.

17/18 **St. John's (Mickleover) Model Railway Group** exhibition at Mickleover Community Centre, Uttoxeter Road, Mickleover, Derby. 10.30 – 8.00 (5.30 Sun). £1.20/60p/£3.00.

17/18 **Wimbledon Model Railway Club** (with Queen Mary's Hospital Transport Extravaganza) at Queen Mary's Hospital for Children, Queen Mary's Avenue, Carshalton Beeches, Surrey. 11.00 – 5.00. £2.00/50p/£4.50.

21 **North Downs Model Railway Circle** model railway meet (collectors extravaganza) at All Saints Church Hall, The Square, Carshalton, Surrey. 7.00 – 9.30. 50p.

24/25 **Railway Enthusiasts' Club** exhibition at The Civic Hall, Knoll Road, Camberley, Surrey. 10.30 – 5.00. (10.00 – 4.30 Sun). £2.50/£1.25/£6.00.

24/25 **Shipley Model Railway Society** 16th annual exhibition at Baildon Recreation Centre, Green Lane, Shipley, West Yorkshire. 10.00 – 7.00 (5.30 Sun). £2.40/£1.10/£5.80.

24/25 **Dean Forest Railway** Lydney Model Railway Exhibition at Lydney Town Hall, Lydney, Glos. 11.00 – 6.00 (5.00 Sun). £1.50/75p.

25 **Merseyside Model Railway Society** open day at the clubrooms, 102 Chester Street, Birkenhead (near Mersey Tunnel exit), Merseyside. 10.00 – 5.00. All welcome. Free.

OCTOBER

1 **The Heathcote O Gauge Society** 7mm modelling event at Humphrey Perkins High School, Cotes Road, Barrow upon Soar (near Loughborough), Leicestershire. 10.30 – 5.00. £1.00/50p.

1 **Beaconsfield & District Model Railway Club** exhibition at The Secondary School, Wattleton Road, Beaconsfield, Bucks. 10.00 – 5.30. £1.50/75p/£3.50.

1/2 **Clyde Model Railway Club (Carluke)** festival of model railways at St. Mary's Halls, Lanark, Scotland. 11.00 – 6.00 (5.00 Sun). £1.50/£1.20.

1/2 **Southport Model Railway Society** exhibition at Meols Cop High School, Southport, Lancs. 10.00 – 8.00 (6.00 Sun). £2.00/£1.00/£5.00.

1/2 **Hackworth Society Model Railway Club** exhibition at The Civic Hall, Shildon, Co. Durham. 10.00 – 5.30 (5.00 Sun). £1.00/50p.

1/2 **Orpington & District Model Railway Society** exhibition at St. Olave's School, Goddington Lane, Orpington, Kent. 10.00 – 6.00 (5.00 Sun). £2.00/£1.25/£5.50.

2/3 **Folkestone, Hythe & District Model Railway Club** 23rd exhibition at the Leas Cliff Hall, Folkestone, Kent. 10.00 – 6.00 (5.00 Sun). £2.00/£1.50.

8 **The Model Railway Club** open day at its headquarters, Keen House, 4 Calshot Street, London N1. Library, test tracks, layout (New Annington). 2.00 p.m. Bring a model. Free.

8 **Manchester Model Railway Society** annual auction at Dean Hall, Mersey Road, Sale, Cheshire. 2.30 start. Free.

8/9 **Croydon Model Railway Society** exhibition at St. Peter's Hall, Ledbury Road, South Croydon, Surrey. 10.30 – 6.00 (11.00 – 5.00 Sun). £1.75/£1.00/£4.50.

8/9 **Todmorden Model Railway Society** exhibition at Todmorden Town Hall, Todmorden, West Yorkshire. 10.00 – 5.00. Admission prices not advised.

15 **Stockport & District Railway Modellers** exhibition at Marple Methodist Church, Church Lane, Marple, Stockport, Cheshire. 9.30 – 6.00. £1.40/70p/£3.90.

EXPO NARROW GAUGE 1994
Saturday, 29th October
White Oak Leisure Centre,
Swanley, Kent.
10.30 – 5.30
Admission: £3.50
(£3.00 for 009 Society and 7mm NG Assoc. members), Children £1.00

GUILDEX 94
Telford Exhibition Centre,
St. Quentin Gate, Telford, Shropshire
Saturday & Sunday, 10th & 11th September
10.00 – 5.00 p.m.

G.O.G. Members £3.00
Non-members £5.00 (per day)

LAYOUTS
'Weston Green' by Ken Cottle – GWR branch to ScaleSeven standards.
'Cussing Vale Halt' by David Murdock – light railway practice.
'Wedmore' by Trevor Gibson – Somerset & Dorset in both pre-Grouping and BR guises.
'Abbots Bromley' by Leicester Postal MRS – LMS terminus station.
'Castel Del Monte' by Keith Thompson – continental narrow gauge based on Spanish practice.
'Bishops Creek and North Shore: by Geoff Bishop – American switching line.
'Upwole' by Barrie Walls – well-known LNER branch built jointly with his son.
'Dale' by Julian Russell – period Midland Railway branch terminus.
'Runswick Bay' by Keighley MRC – continuous-run layout based on the North Eastern Railway.
'Wyandotte' by Chris Iversen – American east coast-based layout.
'Hassell Road' by Alsager Railway Association – continuous run mainline layout.
'Campbelltown & Machrihanish' by Nigel McMillan – 7mm narrow gauge.
'Cresswell Junction' by Stafford MRC – LMS branch terminus.
'Pickford MPD' by East Fife O Gauge Group – 1970s loco depot.
'Churston St. Mary' by Michael Price and Steve Naylor – a GWR branch.
Collectors' layout by Mick Woodman – working Hornby O Gauge.
Children's layout and test track.

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15/16 **Beckenham & West Wickham Model Railway Club** exhibition at Beckenham Leisure Centre, Beckenham Road, Beckenham, Kent. 10.00 – 6.00. £2.00/£1.00/£5.00.

15/16 **Romsey & District Railway Modellers Society** 16th annual exhibition at The Crosfield Hall, Romsey, Hampshire, (town centre). 10.30 – 5.30 (Sat), 10.00 – 5.00 (Sun). £2.00/£1.00/£5.00.

19 **North Downs Model Railway Circle** model railway meet (collectors extravaganza) at All Saints Church Hall, The Square, Carshalton, Surrey. 7.00 – 9.30. 50p.

21-23 **Blackburn & East Lancashire Model Railway Society** 29th exhibition at King George's Hall, Northgate, Blackburn, Lancs. 5.00 – 10.0 (Fri), 10.00 – 8.00 (Sat), 10.00 – 5.00 (Sun). £2.50/£1.50/£6.50.

22 **Chelmsford & District Model Railway Club** (with Deltic Preservation Group) 11th exhibition at Cathedral Primary School, Victoria Road, Chelmsford, Essex. 10.00 – 5.00. £1.50/80p/£3.80.

22 **Tring & District Model Railway Club** exhibition at Ashlyns School, Chesham Road, Berkhamsted, Herts. 10.30 – 5.30. £1.60/80p/£3.90.

22/23 **The Kent & East Sussex Railway Maidstone Area Group** exhibition at Senacre Technology School, Sutton Road (A274), Maidstone, Kent. 10.00 – 5.00. £2.00/£1.00.

22/23 **Westinghouse Model Railway Club** exhibition at the Olympiad Leisure Centre, Sadler's Mead, Chippenham, Wilts. 10.00 – 6.00 (5.00 Sun). £2.50/£1.50/£6.00.

22/23 **Dundee Model Railway Club** exhibition at Marryat Hall, City Square, Dundee. 10.00 – 6.00 (5.00 Sun). £1.50/75p/£3.50.

28-30 **Merseyside Model Railway Society** exhibition at Mosslands School, Mosslands Drive, Wallasey Village, Wirral. 6.00 – 9.00 (Fri), 10.00 – 6.00. £2.00/£1.00/£5.00.

28-30 **Leeds Model Railway Society** 41st annual exhibition at The Leisure Centre, Carr Crofts, Armley, Leeds. 5.30 – 9.00 (Fri), 10.00 – 7.30 (Sat), 10.00 – 5.30 (Sun). £3.00/£1.50/£7.50.

29 **L & NWR Society** autumn meeting at LMRCA (BR Staff Club), Hillmorton Road (A428), Rugby (adjacent to the old GC railway station). 11.00 – 5.30. Free.

29 **Chesham Model Railway Club** open day at the White Hill Centre, Chesham, Bucks. 10.30 – 5.00. £1.00/60p.

29/30 **Hazel Grove & District Model Railway Society** exhibition at Civic Hall, London Road, Hazel Grove, Stockport, Cheshire. 10.00 – 6.00 (5.00 Sun). £1.50/70p.

29/30 **Clydeside Model Railway Club** 27th Cathcart model railway show at the Couper Institute, Clarkston Road, Glasgow. 10.00 – 6.00 (11.00 – 5.00 Sun). £1.40/60p/£3.50.

29/30 **Tunbridge Wells Model Railway Club** exhibition at Victoria Hall, Southborough, Tunbridge Wells, Kent. 10.00 – 5.00. £1.80/90p/£4.50.

MJT
scale components

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2857 LNER 61'6" Kitchen Car (D226/D293)
2858 LNER 61'6" Corridor Composite (D6/D6A/D130)
2859 LNER 61'6" Open Third/Dining Car (D27A)
2860 LNER 61'6" Corridor First (D1/D2)
2861 LNER 61'6" Corridor 4 Compartment Brake Third (D114)
2862 LNER 61'6" Restaurant First (D10C)
2863 LNER 61'6" Corridor Brake Composite (D134/D175)

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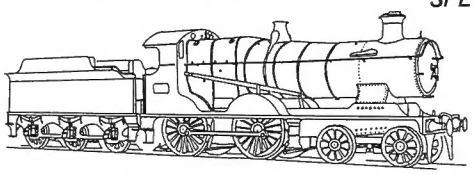

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	4mm	*7mm*
LBSCR/SR D1 0–4–2T	42.50	88.00
LBSCR/SR E1 0–6–0T	42.50	88.00
GWR Rbt Galloping Alice	69.50	–
MSWJR/GWR 4–4–0	58.50	–
GWR 0–4–4T Nos. 34/5	37.50	–
GWR Metro Basic Etches	15.00	40.00
Post & Packing	2.00	4.00
(Basic Metro)	(.75	1.50)

PLEASE NOTE NEW ADDRESS!
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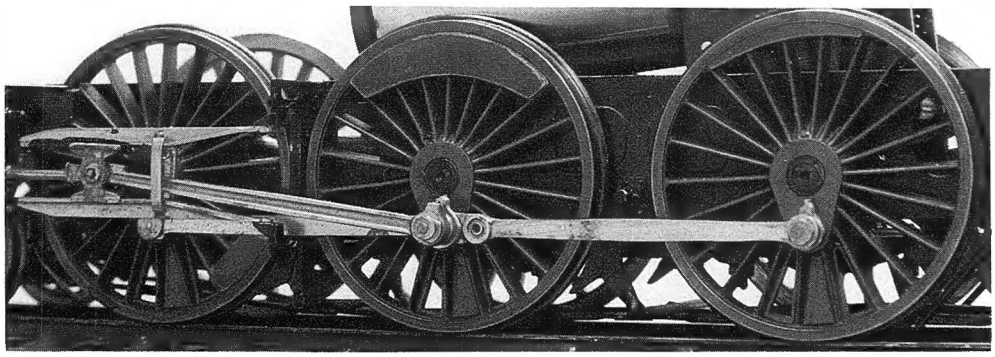
CASTLES need a Good Foundation



NEW – 'CASTLE' WHEELS
for P4, EM or OO

Complete set of wheels for loco and tender including axles and crankpins.

£28.17 + £1.10 P & P
Only available direct.

Please send £1 in stamps for 1994 catalogue.

ULTRASCALE PRODUCTS
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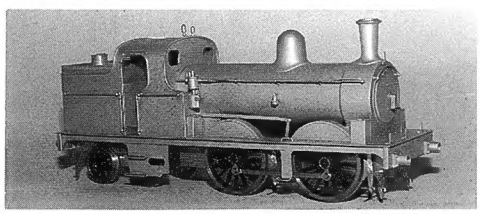
Tel. (0462) 684764

Stephen Barnfield

'Dinsdale', 3 Caverstede Road, Walton,
Peterborough. PE4 6EX. Tel. 0733 571020.



NOW AVAILABLE

NER CLASS BTP – LNER CLASS G6 0–4–4T

in etched brass & nickel silver with cast brass and white metal fittings
4mm scale – £58.00. 7mm scale – £135.00.

The photograph above shows a 5ft 6in Gateshead built version nearing completion in 7mm scale.
Prices include P & P or also available from D & S Models stands at O Gauge Guild, Telford; Scaleforum and Warley National shows.
Parts are included to build 5ft, 5ft 3in and 5ft 6in versions, together with options for plain or riveted bunker. Alternative footsteps, splashers, brakes, guard irons, etc, and parts for inside motion.

M/Q – D17 LOCO AND TENDER KIT

I have been asked several times whether I will be doing another batch of these kits. To make it worthwhile I need to do a batch of twelve. Please ring or drop me a line if you are interested. Target prices: 4mm £92.00, 7mm £195.00.

DRAUGHTSMAN'S LINING OR BOW PENS

Sometimes very difficult to obtain, suitable for lining down to 0.10mm/0.004in. See review in August 'Railway Modeller'. £24.50 inc. P & P

NER LOCO AND COACH TRANSFERS

Still available, although stocks becoming low. Methfix type including characters for up to four locos and coaches and other specials, such as 'dynamometer car' and 'dining saloon'.
4mm £5.00 per sheet + SAE. 7mm £9.75 per sheet + SAE.

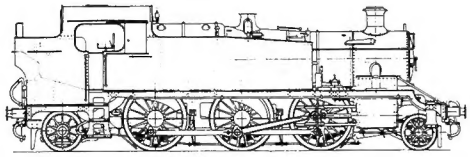
CUSTOM BUILDING AND PAINTING AND LINING

I have been a full-time professional model maker for nearly twenty years now, so can offer that experience in building models either kit or scratchbuilt in 4mm and 7mm scales. Please submit your specification along with an SAE and I will be happy to quote.

I also have a kits, NER fittings and other parts list available which I shall be pleased to send on receipt of an SAE.

During the autumn I shall be at Scaleforum, Peterborough (Sat. only) and Newcastle shows so please come and discuss.

NEW! G.W.R. COLLETT LARGE PRAIRIE 2–6–2T



This new kit is for the Collett development of Churchward's earlier design and covers the 5101 and 6100 classes (numbers 5101-5110, 5150-5199, 6100-6169 and 4100-4179) which were built between 1929 and 1949.

Features of the kit are:

- *Compensated chassis (which can be built rigid) with prototypical joggled rear frames and radial truck.*
- *Highly detailed etchings with over two thousand rivets!*
- *Over 20 lost wax brass castings together with over 25 whitemetal castings.*

4mm – £95.00, 7mm – £240.00 excluding wheels and motor.

RECENTLY INTRODUCED

A1/A3 (right hand drive) 4mm – £105.00, 7mm – £280.00 excluding wheels, motor and tender.
A3 (left hand drive) 4mm – £105.00, 7mm – £280.00 excluding wheels, motor and tender.
7mm hornblocks for the A1/A3. Pack of six – £8.00.
G.N.R. type 8 wheels tender with coal rails. 4mm – £35.00, 7mm – £90.00

GWR 1854/2721 Classes of 0–6–0 Pannier Tank. 4mm – £72.50, 7mm – £190.00
Slater's have now produced the correct pattern 16-spoke driving wheel for this kit which is available from them (Ref. 7855 GWR) @ £9.40 per axle inc. VAT.

GWR CITY Class. 4mm – £75.00, 7mm – £190.00 excluding wheels, motor and tender.

Optional kits to build working inside motion. 4mm – £12.50, 7mm – £25.00
Tenders suitable for City, excluding wheels.
3000 gallon or 3500 gallon. 4mm – £30.00, 7mm – £75.00
7mm hornblocks City and Pannier. Pack of six – £8.00

All prices are inclusive of VAT. Overseas deduct VAT, postage at cost.
Postage & packing (UK) 4mm – kits £1.50 – small items £0.50
7mm – kits £3.50 – small items £1.00
Send SAE for new price lists – please state scale

Next releases – LNER (1928) corridor tender – LNER Gresley A4 4–6–2

I shall be at – Guildex 94, Telford 10/11 September
Scaleforum, Leatherhead 24/25 September – Warley National, NEC 15/16 October

MARTIN FINNEY

10 Heathfields Way,
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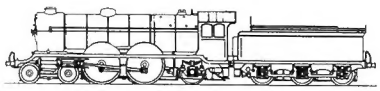

4mm–7mm scale by mail

1 Dochart Crescent, Polmont, Stirlingshire, FK2 0RE (Tel. 0324 711912)

9200 NBR Class D, LNER Class J83 loco frames £12.50
Etched in 20 thou Nickel Silver designed to fit the GEM body kit.

9201 NBR Class A, LNER Class N15 loco frames £12.50
Etched in 20 thou Nickel Silver designed to fit the NB Models body kit.

9202 Loco brake shoes and hangers (6). Suits NB and Caley locos £1.25
Etched in 20 thou Nickel Silver, for locos with 4' 6" dia wheels.

9203 NBR Class C, LNER Class J36 loco and tender frames £16.50
Etched in 20 thou Nickel Silver designed to fit the GEM body kit.

9205 Tender brake shoes and hangers (6). Suits NB and Caley tenders £1.25
Etched in 20 thou Nickel Silver.

9204 NBR Class B and S, LNER Class J37 loco and tender frames will be available around the end of July. The first of our wagon kits is now well under way and should be ready shortly after the J37 frame kit as will a number of components from the wagon kit.

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SAE to above address for free lists of our full range of products and quotations for any 7mm and 10mm 'Ready-to-run' model.

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We are preparing a number of interesting new products for the new modelling season the first of which will be available at Scaleforum. We look forward to showing you these items including the Red Arrow system which is a totally new approach to the operation of model locomotives. It overcomes some of the fundamental problems which have been associated with model railways since their inception.

Other new items include a further range of wagon suspension conversion units, additions to the range of valancing, company notices, slow motion turnout operating units and more architectural surfaces.

Details of our range of products including the popular fixed axleguard suspension, scale couplings, the unique architectural surfaces, scale ivy, mainframe components, turnout operating units, track underlay plus a wide range of items from other manufacturers are in Catalogue No18 (September 1994). Please send **£2 for this 24 page A4 Catalogue** and we will refund £1.50 on your first order over £15.

We are at Scaleforum Sept 24/25; Warley Oct 15/16; Blackburn Oct 21 - 23; Tolworth Nov 12/13 & Watford Nov 19/20.

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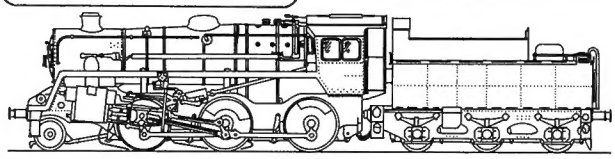
NEW B.R. STANDARD '4' 2–6–0 LOCO + TENDER CHASSIS KIT, DETAILING & COMPLETION PACKS



This, the latest in our series of products for the Dapol plastic loco' kits, will be available in SEPTEMBER; worth waiting for! Release has been delayed as further detailed research was needed on the preserved examples.

CHASSIS KIT. This covers the loco AND tender and is **all nickel silver.** It includes: loco frames including below the running plate smokebox and firebox sides (essential for EM and P4), OO/EM/P4 spacers, cylinders and motion brackets that are both adjustable for width, rods (fluted and plain, double layer), full valve gear, lubricators, wheel balance weights, pony truck and brake gear PLUS tender inside frames, spacers and brake gear. **LOST-WAX BRASS CASTINGS** are included for the crossheads, valve crosshead guides, reverser and injectors. The detailed instructions cover modifications to the Dapol kit. **PRICE £22.25**

BODY DETAILING KIT. This includes spring buffers, handrail knobs for loco and tender, wire, brass vac' pipes and a special etched fret for the tender ladder, steps and loco front steps. **PRICE £10.50**

CHASSIS COMPLETION PACK: This is a Romfords + Mashima pack for 'OO' modellers and contains everything needed to complete a running model. Finescale wheels are available from all the usual sources. **PACK PRICE £31.00**

DAPOL KIT. This can be supplied by BRANCHLINES **PRICE £5.85**

PACKAGE DEAL. As with all the other Dapol-based kits, BRANCHLINES offers a money-saving package deal of Dapol kit, chassis kit, chassis completion pack and body detailing kit for **PRICE £66.00**

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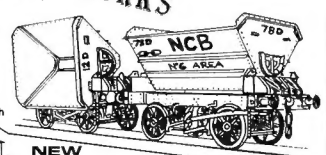

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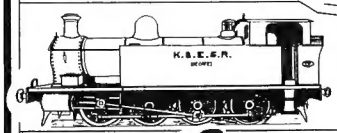

NEW

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Available end of September

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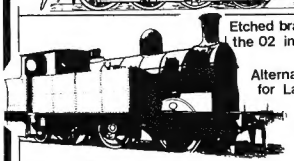

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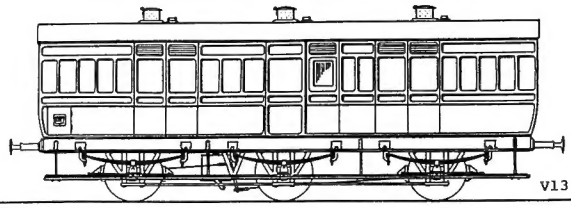

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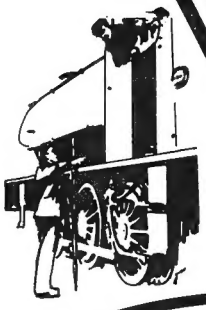

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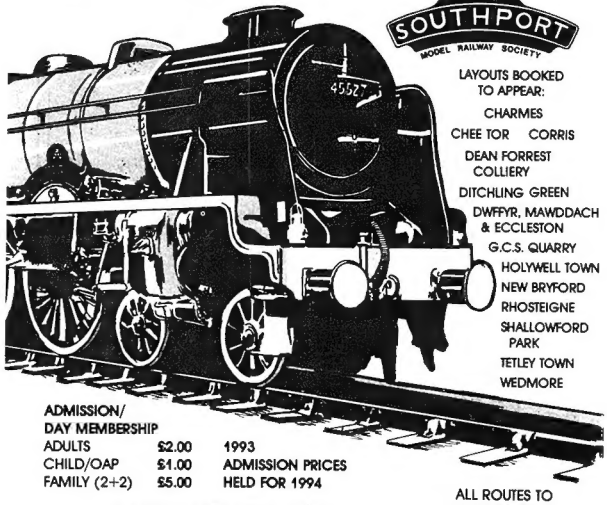

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